Data Analysis using R Programming - BUS4028

Group 08

2025-03-28

Introduction

In this document, we will be working on Data Analysis Assignment for BUS4028. This report performs data analysis using R programming on a climate change dataset. The analysis includes data manipulation, statistical functions, and plotting. The code is also published on GitHub HERE.

Data Loading

Read CSV file climate_change_indicators.csv

```
df <- read.csv("climate_change_indicators.csv")
```

Data Exploration

Print structure of df

```
str(df)
```

```
## 'data.frame':    225 obs. of  72 variables:
##  $ ObjectId           : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ Country            : chr  "Afghanistan, Islamic Rep. of" "Albania" "Algeria" "American Samoa" ...
##  $ ISO2               : chr  "AF" "AL" "DZ" "AS" ...
##  $ ISO3               : chr  "AFG" "ALB" "DZA" "ASM" ...
##  $ Indicator          : chr  "Temperature change with respect to a baseline climatology, correspondi
##  $ Unit               : chr  "Degree Celsius" "Degree Celsius" "Degree Celsius" "Degree Celsius" ...
##  $ Source             : chr  "Food and Agriculture Organization of the United Nations (FAO). 2022. FA
##  $ CTS_Code           : chr  "ECCS" "ECCS" "ECCS" "ECCS" ...
##  $ CTS_Name           : chr  "Surface Temperature Change" "Surface Temperature Change" "Surface Tempe
##  $ CTS_Full_Descriptor: chr  "Environment, Climate Change, Climate Indicators, Surface Temperature Cl
##  $ F1961              : num  -0.113 0.627 0.164 0.079 0.736 0.041 0.086 0.09 0.122 NA ...
##  $ F1962              : num  -0.164 0.326 0.114 -0.042 0.112 -0.152 -0.024 0.031 -0.046 NA ...
##  $ F1963              : num  0.847 0.075 0.077 0.169 -0.752 -0.19 0.234 0.288 0.162 NA ...
##  $ F1964              : num  -0.764 -0.166 0.25 -0.14 0.308 -0.229 0.189 0.214 -0.343 NA ...
##  $ F1965              : num  -0.244 -0.388 -0.1 -0.562 -0.49 -0.196 -0.365 -0.385 0.09 NA ...
##  $ F1966              : num  0.226 0.559 0.433 0.181 0.415 0.175 -0.001 0.097 -0.163 NA ...
##  $ F1967              : num  -0.371 -0.074 -0.026 -0.368 0.637 -0.081 -0.257 -0.192 0 NA ...
##  $ F1968              : num  -0.423 0.081 -0.067 -0.187 0.018 -0.193 -0.2 -0.225 0.472 NA ...
```

```
##  $ F1969             : num  -0.539 -0.013 0.291 0.132 -0.137 0.188 0.317 0.271 0.292 NA ...
##  $ F1970             : num  0.813 -0.106 0.116 -0.047 0.121 0.248 0.082 0.109 0.438 NA ...
##  $ F1971             : num  0.619 -0.195 -0.385 -0.477 -0.326 -0.097 -0.269 -0.233 -0.26 NA ...
##  $ F1972             : num  -1.124 -0.069 -0.348 -0.067 -0.499 ...
##  $ F1973             : num  0.232 -0.288 -0.015 0.33 0.025 0.475 0.17 0.164 -0.139 NA ...
##  $ F1974             : num  -0.489 -0.139 -0.503 -0.308 -0.371 -0.158 -0.37 -0.377 -0.106 NA ...
##  $ F1975             : num  -0.445 -0.211 -0.539 -0.118 0.246 -0.029 -0.334 -0.419 -0.021 NA ...
##  $ F1976             : num  -0.286 -0.683 -0.782 -0.177 -0.045 -0.313 -0.426 -0.467 -0.321 NA ...
##  $ F1977             : num  0.513 0.545 0.504 0.156 -0.093 0.272 0.096 0.076 0.432 NA ...
##  $ F1978             : num  0.129 -0.814 0.012 0.092 -0.163 0.037 0.13 0.161 0.362 NA ...
##  $ F1979             : num  0.361 0.203 0.654 0.341 0.058 0.291 0.034 0.16 0.266 NA ...
##  $ F1980             : num  0.6 -0.414 0.232 0.35 -0.188 0.279 0.698 0.646 0.373 NA ...
##  $ F1981             : num  0.483 -0.351 0.215 0.179 0.178 -0.071 0.532 0.564 0.378 NA ...
##  $ F1982             : num  -0.346 0.173 0.399 0.28 1.044 ...
##  $ F1983             : num  0.164 -0.128 0.56 0.313 0.859 0.487 0.524 0.489 0.046 NA ...
##  $ F1984             : num  0.145 -0.27 -0.004 0.277 -0.157 0.631 0.105 0.009 -0.1 NA ...
##  $ F1985             : num  0.283 -0.103 0.508 0.256 0.059 0.694 0.006 -0.051 0.308 NA ...
##  $ F1986             : num  -0.141 0.569 0.296 0.394 0.387 0.176 0.013 -0.023 0.46 NA ...
##  $ F1987             : num  0.391 -0.106 0.975 0.354 0.397 0.689 0.569 0.649 0.446 NA ...
##  $ F1988             : num  0.919 0.37 1.304 0.509 0.883 ...
##  $ F1989             : num  -0.205 -0.066 0.386 0.143 1.162 ...
##  $ F1990             : num  0.73 0.795 1.266 0.497 1.736 ...
##  $ F1991             : num  -0.168 -0.269 0.031 0.641 0.231 0.341 0.441 0.459 0.261 NA ...
##  $ F1992             : num  -0.294 0.106 -0.312 0.344 0.386 0.466 0.365 0.445 -0.261 -1.31 ...
##  $ F1993             : num  0.22 0.076 0.552 -0.069 0.174 0.256 0.535 0.528 0.086 -0.932 ...
##  $ F1994             : num  0.43 1.33 0.732 0.189 1.508 ...
##  $ F1995             : num  0.359 -0.172 0.595 0.755 1.279 ...
##  $ F1996             : num  -0.116 -0.038 0.846 0.784 0.57 0.37 0.35 0.377 0.512 0.47 ...
##  $ F1997             : num  0.471 0.075 1.059 NA 1.788 ...
##  $ F1998             : num  0.675 0.795 1.109 NA 1.018 ...
##  $ F1999             : num  1.198 0.67 1.476 0.242 1.055 ...
##  $ F2000             : num  0.993 1.065 0.82 0.626 1.05 ...
##  $ F2001             : num  1.311 1.532 1.856 0.904 1.48 ...
##  $ F2002             : num  1.365 0.492 1.258 1.152 0.835 ...
##  $ F2003             : num  0.587 0.97 1.585 0.716 1.949 ...
##  $ F2004             : num  1.373 0.444 0.988 0.191 0.936 ...
##  $ F2005             : num  0.401 0.189 1.264 0.801 0.851 ...
##  $ F2006             : num  1.72 0.345 1.395 0.403 1.485 ...
##  $ F2007             : num  0.675 1.316 1.22 1.032 1.024 ...
##  $ F2008             : num  0.704 0.978 1.185 0.67 0.946 ...
##  $ F2009             : num  0.895 0.91 0.945 NA 1.413 ...
##  $ F2010             : num  1.613 1.191 2.265 1.311 0.471 ...
##  $ F2011             : num  1.397 1.055 1.398 0.854 1.677 ...
##  $ F2012             : num  0.223 1.487 1.147 0.924 1.265 ...
##  $ F2013             : num  1.281 1.333 1.192 1.257 0.831 ...
##  $ F2014             : num  0.456 1.198 1.69 1.17 1.946 ...
##  $ F2015             : num  1.09 1.57 1.12 1.01 1.69 ...
##  $ F2016             : num  1.55 1.46 1.76 1.54 1.99 ...
##  $ F2017             : num  1.54 1.12 1.51 1.44 1.92 ...
##  $ F2018             : num  1.54 2.03 1.21 1.19 1.92 ...
##  $ F2019             : num  0.91 1.68 1.11 1.54 1.96 ...
##  $ F2020             : num  0.498 1.498 1.926 1.43 2.562 ...
##  $ F2021             : num  1.33 1.54 2.33 1.27 1.53 ...
##  $ F2022             : num  2.01 1.52 1.69 1.26 3.24 ...
```

List variables in dataset

```r
ls(df)
```

```
##  [1] "Country"              "CTS_Code"             "CTS_Full_Descriptor"
##  [4] "CTS_Name"             "F1961"                "F1962"
##  [7] "F1963"                "F1964"                "F1965"
## [10] "F1966"                "F1967"                "F1968"
## [13] "F1969"                "F1970"                "F1971"
## [16] "F1972"                "F1973"                "F1974"
## [19] "F1975"                "F1976"                "F1977"
## [22] "F1978"                "F1979"                "F1980"
## [25] "F1981"                "F1982"                "F1983"
## [28] "F1984"                "F1985"                "F1986"
## [31] "F1987"                "F1988"                "F1989"
## [34] "F1990"                "F1991"                "F1992"
## [37] "F1993"                "F1994"                "F1995"
## [40] "F1996"                "F1997"                "F1998"
## [43] "F1999"                "F2000"                "F2001"
## [46] "F2002"                "F2003"                "F2004"
## [49] "F2005"                "F2006"                "F2007"
## [52] "F2008"                "F2009"                "F2010"
## [55] "F2011"                "F2012"                "F2013"
## [58] "F2014"                "F2015"                "F2016"
## [61] "F2017"                "F2018"                "F2019"
## [64] "F2020"                "F2021"                "F2022"
## [67] "Indicator"            "ISO2"                 "ISO3"
## [70] "ObjectId"             "Source"               "Unit"
```

Print Top 15 Rows of Dataset

```r
head(df, 15)
```

```
##    ObjectId                           Country ISO2 ISO3
## 1         1      Afghanistan, Islamic Rep. of   AF  AFG
## 2         2                           Albania   AL  ALB
## 3         3                           Algeria   DZ  DZA
## 4         4                    American Samoa   AS  ASM
## 5         5          Andorra, Principality of   AD  AND
## 6         6                            Angola   AO  AGO
## 7         7                          Anguilla   AI  AIA
## 8         8               Antigua and Barbuda   AG  ATG
## 9         9                         Argentina   AR  ARG
## 10       10                  Armenia, Rep. of   AM  ARM
## 11       11 Aruba, Kingdom of the Netherlands   AW  ABW
## 12       12                         Australia   AU  AUS
## 13       13                           Austria   AT  AUT
## 14       14               Azerbaijan, Rep. of   AZ  AZE
## 15       15                      Bahamas, The   BS  BHS
##                                                                                     Indicator
```

```
## 1  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 2  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 3  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 4  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 5  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 6  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 7  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 8  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 9  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 10 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 11 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 12 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 13 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 14 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 15 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
##              Unit
## 1  Degree Celsius
## 2  Degree Celsius
## 3  Degree Celsius
## 4  Degree Celsius
## 5  Degree Celsius
## 6  Degree Celsius
## 7  Degree Celsius
## 8  Degree Celsius
## 9  Degree Celsius
## 10 Degree Celsius
## 11 Degree Celsius
## 12 Degree Celsius
## 13 Degree Celsius
## 14 Degree Celsius
## 15 Degree Celsius
##
## 1  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 2  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 3  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 4  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 5  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 6  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 7  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 8  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 9  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 10 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 11 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 12 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 13 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 14 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 15 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
##    CTS_Code                    CTS_Name
## 1      ECCS Surface Temperature Change
## 2      ECCS Surface Temperature Change
## 3      ECCS Surface Temperature Change
## 4      ECCS Surface Temperature Change
## 5      ECCS Surface Temperature Change
## 6      ECCS Surface Temperature Change
```

```
## 7      ECCS Surface Temperature Change
## 8      ECCS Surface Temperature Change
## 9      ECCS Surface Temperature Change
## 10     ECCS Surface Temperature Change
## 11     ECCS Surface Temperature Change
## 12     ECCS Surface Temperature Change
## 13     ECCS Surface Temperature Change
## 14     ECCS Surface Temperature Change
## 15     ECCS Surface Temperature Change
##                                                                CTS_Full_Descriptor
## 1  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 2  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 3  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 4  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 5  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 6  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 7  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 8  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 9  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 10 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 11 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 12 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 13 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 14 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 15 Environment, Climate Change, Climate Indicators, Surface Temperature Change
##     F1961  F1962  F1963  F1964  F1965  F1966  F1967  F1968  F1969  F1970  F1971
## 1  -0.113 -0.164  0.847 -0.764 -0.244  0.226 -0.371 -0.423 -0.539  0.813  0.619
## 2   0.627  0.326  0.075 -0.166 -0.388  0.559 -0.074  0.081 -0.013 -0.106 -0.195
## 3   0.164  0.114  0.077  0.250 -0.100  0.433 -0.026 -0.067  0.291  0.116 -0.385
## 4   0.079 -0.042  0.169 -0.140 -0.562  0.181 -0.368 -0.187  0.132 -0.047 -0.477
## 5   0.736  0.112 -0.752  0.308 -0.490  0.415  0.637  0.018 -0.137  0.121 -0.326
## 6   0.041 -0.152 -0.190 -0.229 -0.196  0.175 -0.081 -0.193  0.188  0.248 -0.097
## 7   0.086 -0.024  0.234  0.189 -0.365 -0.001 -0.257 -0.200  0.317  0.082 -0.269
## 8   0.090  0.031  0.288  0.214 -0.385  0.097 -0.192 -0.225  0.271  0.109 -0.233
## 9   0.122 -0.046  0.162 -0.343  0.090 -0.163  0.000  0.472  0.292  0.438 -0.260
## 10     NA     NA     NA     NA     NA     NA     NA     NA     NA     NA     NA
## 11 -0.100  0.138  0.084  0.271 -0.180  0.122 -0.258  0.055  0.476  0.354 -0.349
## 12  0.157  0.126 -0.096 -0.012  0.140 -0.230 -0.093 -0.203  0.103 -0.007 -0.044
## 13  1.031 -0.621 -0.727 -0.371 -0.883  0.602  0.676  0.211 -0.126 -0.550 -0.060
## 14     NA     NA     NA     NA     NA     NA     NA     NA     NA     NA     NA
## 15  0.073 -0.062 -0.097  0.192  0.054 -0.172 -0.146 -0.324 -0.065 -0.469 -0.055
##     F1972  F1973  F1974  F1975  F1976  F1977  F1978  F1979  F1980  F1981  F1982
## 1  -1.124  0.232 -0.489 -0.445 -0.286  0.513  0.129  0.361  0.600  0.483 -0.346
## 2  -0.069 -0.288 -0.139 -0.211 -0.683  0.545 -0.814  0.203 -0.414 -0.351  0.173
## 3  -0.348 -0.015 -0.503 -0.539 -0.782  0.504  0.012  0.654  0.232  0.215  0.399
## 4  -0.067  0.330 -0.308 -0.118 -0.177  0.156  0.092  0.341  0.350  0.179  0.280
## 5  -0.499  0.025 -0.371  0.246 -0.045 -0.093 -0.163  0.058 -0.188  0.178  1.044
## 6  -0.035  0.475 -0.158 -0.029 -0.313  0.272  0.037  0.291  0.279 -0.071  0.164
## 7  -0.179  0.170 -0.370 -0.334 -0.426  0.096  0.130  0.034  0.698  0.532  0.097
## 8  -0.214  0.164 -0.377 -0.419 -0.467  0.076  0.161  0.160  0.646  0.564  0.162
## 9  -0.008 -0.139 -0.106 -0.021 -0.321  0.432  0.362  0.266  0.373  0.378  0.359
## 10     NA     NA     NA     NA     NA     NA     NA     NA     NA     NA     NA
## 11 -0.020  0.149 -0.448 -0.253 -0.518  0.182     NA     NA  0.452  0.469  0.309
## 12  0.091  0.831 -0.354  0.048 -0.522  0.176  0.062  0.375  0.887  0.495  0.186
```

```
## 13  0.103 -0.033  0.314  0.860  0.216  0.499 -0.476 -0.112 -0.274  0.277  0.384
## 14     NA     NA     NA     NA     NA     NA     NA     NA     NA     NA     NA
## 15  0.301  0.166 -0.058  0.334 -0.241 -0.040  0.040  0.133  0.377 -0.030  0.531
##     F1983  F1984  F1985  F1986  F1987  F1988  F1989 F1990  F1991  F1992  F1993
## 1   0.164  0.145  0.283 -0.141  0.391  0.919 -0.205 0.730 -0.168 -0.294  0.220
## 2  -0.128 -0.270 -0.103  0.569 -0.106  0.370 -0.066 0.795 -0.269  0.106  0.076
## 3   0.560 -0.004  0.508  0.296  0.975  1.304  0.386 1.266  0.031 -0.312  0.552
## 4   0.313  0.277  0.256  0.394  0.354  0.509  0.143 0.497  0.641  0.344 -0.069
## 5   0.859 -0.157  0.059  0.387  0.397  0.883  1.162 1.736  0.231  0.386  0.174
## 6   0.487  0.631  0.694  0.176  0.689  0.572 -0.055 0.687  0.341  0.466  0.256
## 7   0.524  0.105  0.006  0.013  0.569  0.457 -0.002 0.432  0.441  0.365  0.535
## 8   0.489  0.009 -0.051 -0.023  0.649  0.395 -0.077 0.417  0.459  0.445  0.528
## 9   0.046 -0.100  0.308  0.460  0.446 -0.192  0.611 0.436  0.261 -0.261  0.086
## 10     NA     NA     NA     NA     NA     NA     NA    NA     NA -1.310 -0.932
## 11  0.602 -0.020 -0.076  0.040  0.806  0.388 -0.066 0.279  0.331     NA     NA
## 12  0.633 -0.157  0.349  0.388  0.363  0.960  0.153 0.549  0.820  0.281  0.484
## 13  1.062 -0.249 -0.568  0.319 -0.263  0.820  1.104 1.262  0.125  1.248  0.527
## 14     NA     NA     NA     NA     NA     NA     NA    NA     NA -0.839 -1.009
## 15  0.155  0.020  0.242  0.230  0.466  0.426  0.672 0.764  0.788  0.286  0.378
##    F1994  F1995  F1996 F1997 F1998 F1999  F2000 F2001 F2002  F2003 F2004 F2005
## 1  0.430  0.359 -0.116 0.471 0.675 1.198  0.993 1.311 1.365  0.587 1.373 0.401
## 2  1.330 -0.172 -0.038 0.075 0.795 0.670  1.065 1.532 0.492  0.970 0.444 0.189
## 3  0.732  0.595  0.846 1.059 1.109 1.476  0.820 1.856 1.258  1.585 0.988 1.264
## 4  0.189  0.755  0.784    NA    NA 0.242  0.626 0.904 1.152  0.716 0.191 0.801
## 5  1.508  1.279  0.570 1.788 1.018 1.055  1.050 1.480 0.835  1.949 0.936 0.851
## 6  0.212  0.753  0.370 0.107 1.064 0.417  0.169 0.295 0.735  0.889 0.414 1.021
## 7  0.575  0.651  0.350 0.459 1.060 0.532  0.264 0.587 0.706  0.816 0.521 0.828
## 8  0.493  0.677  0.377 0.455 1.046 0.541  0.335    NA 0.634  0.783 0.501 0.843
## 9  0.487  0.259  0.512 0.759 0.351 0.160 -0.186 0.425 0.278  0.635 0.470 0.281
## 10 0.481  0.697  0.470 0.599 1.316 1.488  1.031 1.395 1.194  0.141 1.162 0.480
## 11 0.528  0.802     NA    NA    NA    NA     NA    NA    NA  1.067 0.661 0.836
## 12 0.221  0.413  0.604 0.383 1.092 0.580  0.148 0.336 0.736  0.835 0.723 1.211
## 13 1.958  0.939 -0.203 0.514 1.343 0.986  1.769 1.501 1.531  1.464 0.829 0.628
## 14 0.098  1.012  0.244 0.582 1.184 1.224  1.098 1.401 1.432 -0.147 1.303 0.814
## 15 0.801  0.671  0.008 0.787 0.924 0.619  0.163 0.135 0.856  0.989 0.311 0.455
##    F2006  F2007 F2008 F2009 F2010 F2011 F2012 F2013 F2014 F2015 F2016 F2017
## 1  1.720  0.675 0.704 0.895 1.613 1.397 0.223 1.281 0.456 1.093 1.555 1.540
## 2  0.345  1.316 0.978 0.910 1.191 1.055 1.487 1.333 1.198 1.569 1.464 1.121
## 3  1.395  1.220 1.185 0.945 2.265 1.398 1.147 1.192 1.690 1.121 1.757 1.512
## 4  0.403  1.032 0.670    NA 1.311 0.854 0.924 1.257 1.170 1.009 1.539 1.435
## 5  1.485  1.024 0.946 1.413 0.471 1.677 1.265 0.831 1.946 1.690 1.990 1.925
## 6  0.561  0.885 0.501 0.708 1.194 0.880 0.552 1.044 0.828 1.331 1.609 0.870
## 7  0.691  0.957 0.411 0.566 1.090 0.489 0.640 0.770 0.814 1.051 1.125 0.960
## 8  0.659  0.934 0.394 0.498 1.153 0.586 0.696 0.783 0.744 1.035 1.097 0.958
## 9  0.596 -0.169 0.601 0.857 0.135 0.386 0.798 0.442 0.951 0.957 0.488 1.095
## 10 1.621  0.706 0.861 0.706 2.775 0.650 1.247 1.407 1.283 1.931 1.356 0.889
## 11 0.510  0.935    NA    NA 1.309 0.509 0.580 1.094 0.986 1.149    NA 1.303
## 12 0.721  0.929 0.625 1.030 0.673 0.208 0.308 1.499 1.198 1.087 1.172 1.141
## 13 0.907  2.137 1.582 1.544 0.656 1.373 1.783 1.098 2.409 2.167 2.096 1.741
## 14 1.488  0.958 0.883 0.780 2.327 0.766 1.474 1.574 1.252 1.672 1.530 1.308
## 15 0.385  0.937 0.842 0.410 0.314 0.363 0.344 0.565 0.883 1.114 1.042 1.331
##    F2018 F2019 F2020 F2021 F2022
## 1  1.544 0.910 0.498 1.327 2.012
## 2  2.028 1.675 1.498 1.536 1.518
```

```
## 3  1.210 1.115 1.926 2.330 1.688
## 4  1.189 1.539 1.430 1.268 1.256
## 5  1.919 1.964 2.562 1.533 3.243
## 6  1.395 1.752 1.162 1.553 1.212
## 7  0.664 0.843 1.224 0.893 0.839
## 8  0.627 0.797 1.131 0.862 0.770
## 9  0.878 0.760 1.123 1.031 0.643
## 10 2.772 1.859 1.954 2.087 1.707
## 11 0.698 1.007 1.281    NA    NA
## 12 1.129 1.422 1.416 0.629 0.754
## 13 2.524 2.370 2.315 1.395 2.498
## 14 2.240 1.997 2.015 2.061 2.080
## 15 1.023 1.443 1.611 0.879 1.480
```

User-Defined Function

Create a User Defined Function

```r
celsius_to_fahreheit <- function(temp) { return ((temp * 9/5) + 32)}
df$F2022_Fahrenheit <- celsius_to_fahreheit(df$F2022)
print(df$F2022_Fahrenheit)
```

```
##   [1] 35.6216 34.7324 35.0384 34.2608 37.8374 34.1816 33.5102 33.3860 33.1574
##  [10] 35.0726      NA 33.3572 36.4964 35.7440 34.6640 35.6306 34.1888      NA
##  [19] 35.4596 37.0526 33.8558 33.5912 34.7414 33.1592 35.7638 29.6510 33.6668
##  [28] 33.5750 34.6028 35.2958 33.4436      NA 35.3354 33.7064 33.8792 34.2824
##  [37] 33.7532 33.8576 33.3284 32.7326 34.5776 34.5776 35.4308 33.5732 32.9378
##  [46] 34.6640 34.2410 32.8622      NA 35.9762 34.5866 34.2266 36.3092 35.9942
##  [55] 34.7846 33.2384 33.7676 33.3248 33.1790 33.1844 34.2446 32.9540 35.5298
##  [64] 34.4678 34.6190      NA 34.5128 34.4228 35.7116 37.2722 32.6462 33.7892
##  [73] 34.3814 34.7180 36.6728 33.7928 36.0104 33.8720 34.5434 33.2564 33.3914
##  [82] 33.6488 34.1510 34.3310 33.9188 33.9710 35.6504 33.3014 35.8556 34.1618
##  [91] 33.4220 33.9530 36.2660 35.8646 35.1752 35.3120 33.9422 35.8430 34.0520
## [100] 34.4030 34.4444 36.8816 34.3040      NA 34.8980 34.9862 36.0950 36.7142
## [109] 34.0016 35.5154 34.3220 34.4696 34.8008 33.0062 36.5612 35.5280 37.2668
## [118] 33.5480 33.4688 34.4606 33.4112 33.5966 35.5190 32.0126 33.2312 35.0798
## [127] 33.0710 33.2204 34.2482 33.1286 35.8574 36.9266 35.9546 35.3570 33.3860
## [136] 36.1454 33.5012 34.5848 32.4302      NA 34.0376 36.6818 36.3578 34.3742
## [145] 33.5156 32.7704 33.4238      NA 34.2050 34.5272 35.4524 33.8990 34.5002
## [154] 35.0096 33.3104 34.1978 33.1682 33.5804 34.5290      NA 35.7008 36.1724
## [163] 33.5264 35.3390 35.5082 36.0698      NA 35.0348 35.4992 34.0808 35.8070
## [172] 34.3778 35.1410 34.5290 35.4884 33.5696 34.3904 34.3598 35.6324 36.3830
## [181] 33.8684 34.6082 33.9692 33.7694 36.4802 33.8072 33.3860 33.2402 33.2564
## [190] 33.3914 34.3328 35.7980 37.0364 34.7630 34.4894 35.7332 33.6398 33.8252
## [199] 34.3670 33.7550      NA 33.5228 33.2852 36.1238 36.5504 33.6992 33.1934
## [208] 34.5488 35.4758 34.6676 35.4398 34.1906 33.6092 32.6876 36.6926 34.6622
## [217] 32.9594 33.8594 33.7118 33.9332 35.5460 34.5092      NA 33.2348 31.1180
```

Data Manipulation

Filtering Rows using subset() where Country = Canada

```
canada_df <- subset(df, ISO3 == "CAN")
head(canada_df)
```

```
##    ObjectId Country ISO2 ISO3
## 36       36  Canada   CA  CAN
##                                                                                                  Indicator
## 36 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
##              Unit
## 36 Degree Celsius
##
## 36 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
##    CTS_Code                    CTS_Name
## 36     ECCS Surface Temperature Change
##                                                          CTS_Full_Descriptor
## 36 Environment, Climate Change, Climate Indicators, Surface Temperature Change
##    F1961  F1962 F1963  F1964  F1965  F1966  F1967 F1968  F1969 F1970  F1971
## 36 0.057 -0.118 0.335 -0.299 -0.867 -0.152 -0.452 0.476 -0.003 0.426 -0.023
##     F1972 F1973  F1974 F1975 F1976 F1977  F1978  F1979 F1980 F1981  F1982 F1983
## 36 -1.796 0.306 -0.846 0.225 0.083 1.079 -0.605 -0.214 0.917 1.562 -0.673 0.488
##    F1984  F1985 F1986 F1987 F1988 F1989 F1990 F1991 F1992 F1993 F1994 F1995
## 36 0.337 -0.311 0.011  1.34 1.204 0.017 0.078 0.336   0.1 0.342 0.467 0.938
##     F1996 F1997 F1998 F1999 F2000 F2001 F2002 F2003 F2004 F2005 F2006 F2007
## 36 -0.125 0.426  2.47 1.694 1.291 1.421  0.54  1.24 0.485 1.282 2.343 1.333
##    F2008 F2009 F2010 F2011 F2012 F2013 F2014 F2015 F2016 F2017 F2018 F2019
## 36 0.851 0.539 2.915 1.438 2.144 1.182 0.288 1.231 2.373  1.48 0.477 1.311
##    F2020 F2021 F2022 F2022_Fahrenheit
## 36 1.128 2.515 1.268          34.2824
```

Identify dependent and Independent Variables and Reshape the data

```
#selected two columns for reshaping i.e. Country and F2022
selected_data <- df[, c("Country", "F2022")]
library(reshape2)
melted_data <- melt(selected_data, id.vars = "Country",
                    variable.name = "Year", value.name = "TemperatureChange")
print(melted_data)
```

```
##                                Country  Year TemperatureChange
## 1          Afghanistan, Islamic Rep. of F2022             2.012
## 2                               Albania F2022             1.518
## 3                               Algeria F2022             1.688
## 4                        American Samoa F2022             1.256
## 5               Andorra, Principality of F2022             3.243
## 6                                Angola F2022             1.212
## 7                              Anguilla F2022             0.839
## 8                   Antigua and Barbuda F2022             0.770
```

```
## 9                            Argentina F2022            0.643
## 10                       Armenia, Rep. of F2022            1.707
## 11    Aruba, Kingdom of the Netherlands F2022               NA
## 12                           Australia F2022            0.754
## 13                             Austria F2022            2.498
## 14                  Azerbaijan, Rep. of F2022            2.080
## 15                         Bahamas, The F2022            1.480
## 16                  Bahrain, Kingdom of F2022            2.017
## 17                           Bangladesh F2022            1.216
## 18                             Barbados F2022               NA
## 19                     Belarus, Rep. of F2022            1.922
## 20                             Belgium F2022            2.807
## 21                              Belize F2022            1.031
## 22                               Benin F2022            0.884
## 23                              Bhutan F2022            1.523
## 24                             Bolivia F2022            0.644
## 25               Bosnia and Herzegovina F2022            2.091
## 26                             Botswana F2022           -1.305
## 27                               Brazil F2022            0.926
## 28               British Virgin Islands F2022            0.875
## 29                    Brunei Darussalam F2022            1.446
## 30                             Bulgaria F2022            1.831
## 31                          Burkina Faso F2022            0.802
## 32                               Burundi F2022               NA
## 33                            Cabo Verde F2022            1.853
## 34                              Cambodia F2022            0.948
## 35                              Cameroon F2022            1.044
## 36                                Canada F2022            1.268
## 37                        Cayman Islands F2022            0.974
## 38                  Central African Rep. F2022            1.032
## 39                                  Chad F2022            0.738
## 40                                 Chile F2022            0.407
## 41               China, P.R.: Hong Kong F2022            1.432
## 42                   China, P.R.: Macao F2022            1.432
## 43                  China, P.R.: Mainland F2022            1.906
## 44                              Colombia F2022            0.874
## 45                Comoros, Union of the F2022            0.521
## 46              Congo, Dem. Rep. of the F2022            1.480
## 47                       Congo, Rep. of F2022            1.245
## 48                         Cook Islands F2022            0.479
## 49                           Costa Rica F2022               NA
## 50                       Croatia, Rep. of F2022            2.209
## 51                                  Cuba F2022            1.437
## 52                                Cyprus F2022            1.237
## 53                            Czech Rep. F2022            2.394
## 54                               Denmark F2022            2.219
## 55                              Djibouti F2022            1.547
## 56                              Dominica F2022            0.688
## 57                          Dominican Rep. F2022            0.982
## 58                               Ecuador F2022            0.736
## 59                    Egypt, Arab Rep. of F2022            0.655
## 60                             El Salvador F2022            0.658
## 61           Equatorial Guinea, Rep. of F2022            1.247
## 62                Eritrea, The State of F2022            0.530
```

```
## 63                    Estonia, Rep. of F2022           1.961
## 64                 Eswatini, Kingdom of F2022           1.371
## 65  Ethiopia, The Federal Dem. Rep. of F2022           1.455
## 66         Falkland Islands (Malvinas) F2022              NA
## 67                       Faroe Islands F2022           1.396
## 68                       Fiji, Rep. of F2022           1.346
## 69                             Finland F2022           2.062
## 70                              France F2022           2.929
## 71                   French Polynesia F2022           0.359
## 72                               Gabon F2022           0.994
## 73                          Gambia, The F2022           1.323
## 74                             Georgia F2022           1.510
## 75                             Germany F2022           2.596
## 76                               Ghana F2022           0.996
## 77                           Gibraltar F2022           2.228
## 78                              Greece F2022           1.040
## 79                           Greenland F2022           1.413
## 80                             Grenada F2022           0.698
## 81                          Guadeloupe F2022           0.773
## 82                           Guatemala F2022           0.916
## 83                              Guinea F2022           1.195
## 84                       Guinea-Bissau F2022           1.295
## 85                              Guyana F2022           1.066
## 86                               Haiti F2022           1.095
## 87                           Holy See F2022           2.028
## 88                            Honduras F2022           0.723
## 89                             Hungary F2022           2.142
## 90                             Iceland F2022           1.201
## 91                               India F2022           0.790
## 92                           Indonesia F2022           1.085
## 93               Iran, Islamic Rep. of F2022           2.370
## 94                                Iraq F2022           2.147
## 95                             Ireland F2022           1.764
## 96                          Isle of Man F2022           1.840
## 97                              Israel F2022           1.079
## 98                               Italy F2022           2.135
## 99                             Jamaica F2022           1.140
## 100                              Japan F2022           1.335
## 101                             Jordan F2022           1.358
## 102               Kazakhstan, Rep. of F2022           2.712
## 103                              Kenya F2022           1.280
## 104                           Kiribati F2022              NA
## 105       Korea, Dem. People's Rep. of F2022           1.610
## 106                    Korea, Rep. of F2022           1.659
## 107                             Kuwait F2022           2.275
## 108                         Kyrgyz Rep. F2022           2.619
## 109             Lao People's Dem. Rep. F2022           1.112
## 110                             Latvia F2022           1.953
## 111                            Lebanon F2022           1.290
## 112               Lesotho, Kingdom of F2022           1.372
## 113                            Liberia F2022           1.556
## 114                              Libya F2022           0.559
## 115                      Liechtenstein F2022           2.534
## 116                          Lithuania F2022           1.960
```

```
## 117                         Luxembourg F2022           2.926
## 118                Madagascar, Rep. of F2022           0.860
## 119                             Malawi F2022           0.816
## 120                           Malaysia F2022           1.367
## 121                           Maldives F2022           0.784
## 122                               Mali F2022           0.887
## 123                              Malta F2022           1.955
## 124       Marshall Islands, Rep. of the F2022           0.007
## 125                         Martinique F2022           0.684
## 126         Mauritania, Islamic Rep. of F2022           1.711
## 127                         Mauritius F2022           0.595
## 128                           Mayotte F2022           0.678
## 129                            Mexico F2022           1.249
## 130     Micronesia, Federated States of F2022           0.627
## 131                   Moldova, Rep. of F2022           2.143
## 132                            Monaco F2022           2.737
## 133                          Mongolia F2022           2.197
## 134                        Montenegro F2022           1.865
## 135                        Montserrat F2022           0.770
## 136                           Morocco F2022           2.303
## 137                Mozambique, Rep. of F2022           0.834
## 138                           Myanmar F2022           1.436
## 139                           Namibia F2022           0.239
## 140                     Nauru, Rep. of F2022              NA
## 141                             Nepal F2022           1.132
## 142                   Netherlands, The F2022           2.601
## 143                      New Caledonia F2022           2.421
## 144                        New Zealand F2022           1.319
## 145                          Nicaragua F2022           0.842
## 146                              Niger F2022           0.428
## 147                            Nigeria F2022           0.791
## 148                               Niue F2022              NA
## 149                      Norfolk Island F2022           1.225
## 150       North Macedonia, Republic of  F2022           1.404
## 151                             Norway F2022           1.918
## 152                               Oman F2022           1.055
## 153                           Pakistan F2022           1.389
## 154                     Palau, Rep. of F2022           1.672
## 155                             Panama F2022           0.728
## 156                   Papua New Guinea F2022           1.221
## 157                           Paraguay F2022           0.649
## 158                               Peru F2022           0.878
## 159                        Philippines F2022           1.405
## 160                     Pitcairn Islands F2022              NA
## 161                      Poland, Rep. of F2022           2.056
## 162                           Portugal F2022           2.318
## 163                        Puerto Rico F2022           0.848
## 164                              Qatar F2022           1.855
## 165                            Romania F2022           1.949
## 166                  Russian Federation F2022           2.261
## 167                             Rwanda F2022              NA
## 168                       Saint Helena F2022           1.686
## 169           Saint Pierre and Miquelon F2022           1.944
## 170                              Samoa F2022           1.156
```

```
## 171                 San Marino, Rep. of F2022           2.115
## 172 São Tomé and Príncipe, Dem. Rep. of F2022           1.321
## 173                       Saudi Arabia F2022           1.745
## 174                            Senegal F2022           1.405
## 175                     Serbia, Rep. of F2022           1.938
## 176                          Seychelles F2022           0.872
## 177                       Sierra Leone F2022           1.328
## 178                          Singapore F2022           1.311
## 179                        Slovak Rep. F2022           2.018
## 180                   Slovenia, Rep. of F2022           2.435
## 181                     Solomon Islands F2022           1.038
## 182                            Somalia F2022           1.449
## 183                       South Africa F2022           1.094
## 184                South Sudan, Rep. of F2022           0.983
## 185                              Spain F2022           2.489
## 186                          Sri Lanka F2022           1.004
## 187                St. Kitts and Nevis F2022           0.770
## 188                          St. Lucia F2022           0.689
## 189     St. Vincent and the Grenadines F2022           0.698
## 190                              Sudan F2022           0.773
## 191                           Suriname F2022           1.296
## 192                             Sweden F2022           2.110
## 193                        Switzerland F2022           2.798
## 194                    Syrian Arab Rep. F2022           1.535
## 195            Taiwan Province of China F2022           1.383
## 196                 Tajikistan, Rep. of F2022           2.074
## 197            Tanzania, United Rep. of F2022           0.911
## 198                           Thailand F2022           1.014
## 199           Timor-Leste, Dem. Rep. of F2022           1.315
## 200                               Togo F2022           0.975
## 201                            Tokelau F2022              NA
## 202                              Tonga F2022           0.846
## 203                  Trinidad and Tobago F2022           0.714
## 204                            Tunisia F2022           2.291
## 205                         Turkmenistan F2022           2.528
## 206            Turks and Caicos Islands F2022           0.944
## 207                              Tuvalu F2022           0.663
## 208                              Uganda F2022           1.416
## 209                             Ukraine F2022           1.931
## 210                United Arab Emirates F2022           1.482
## 211                      United Kingdom F2022           1.911
## 212                       United States F2022           1.217
## 213        United States Virgin Islands F2022           0.894
## 214                             Uruguay F2022           0.382
## 215                  Uzbekistan, Rep. of F2022           2.607
## 216                             Vanuatu F2022           1.479
## 217      Venezuela, Rep. Bolivariana de F2022           0.533
## 218                             Vietnam F2022           1.033
## 219           Wallis and Futuna Islands F2022           0.951
## 220                  West Bank and Gaza F2022           1.074
## 221                      Western Sahara F2022           1.970
## 222                               World F2022           1.394
## 223                      Yemen, Rep. of F2022              NA
## 224                              Zambia F2022           0.686
```

```
## 225                          Zimbabwe F2022           -0.490
```

Remove Missing Values from Data Frame

```
df <- na.omit(df)
```

Identify and Remove Duplicated Data

```
#identify duplicate rows
duplicate_rows <- duplicated(df)
print("Duplicate Rows:")
```

```
## [1] "Duplicate Rows:"
```

```
print(duplicate_rows)
```

```
##   [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [13] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [25] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [37] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [49] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [61] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [73] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [85] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [97] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [109] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [121] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [133] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [145] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [157] FALSE
```

```
#Remove duplicate rows
unique_df <- unique(df)
print("DataFrame after removing duplicates:")
```

```
## [1] "DataFrame after removing duplicates:"
```

```
print(unique_df)
```

```
##     ObjectId                        Country ISO2 ISO3
## 1          1   Afghanistan, Islamic Rep. of   AF  AFG
## 2          2                        Albania   AL  ALB
## 3          3                        Algeria   DZ  DZA
## 5          5       Andorra, Principality of   AD  AND
## 6          6                         Angola   AO  AGO
## 7          7                       Anguilla   AI  AIA
## 9          9                      Argentina   AR  ARG
```

```
## 12        12                    Australia   AU  AUS
## 13        13                      Austria   AT  AUT
## 15        15                 Bahamas, The   BS  BHS
## 16        16           Bahrain, Kingdom of   BH  BHR
## 17        17                   Bangladesh   BD  BGD
## 21        21                       Belize   BZ  BLZ
## 22        22                        Benin   BJ  BEN
## 23        23                       Bhutan   BT  BTN
## 24        24                      Bolivia   BO  BOL
## 26        26                     Botswana   BW  BWA
## 27        27                       Brazil   BR  BRA
## 28        28        British Virgin Islands   VG  VGB
## 29        29             Brunei Darussalam   BN  BRN
## 30        30                     Bulgaria   BG  BGR
## 31        31                 Burkina Faso   BF  BFA
## 34        34                     Cambodia   KH  KHM
## 35        35                     Cameroon   CM  CMR
## 36        36                       Canada   CA  CAN
## 38        38          Central African Rep.   CF  CAF
## 39        39                         Chad   TD  TCD
## 40        40                        Chile   CL  CHL
## 41        41        China, P.R.: Hong Kong   HK  HKG
## 42        42            China, P.R.: Macao   MO  MAC
## 43        43         China, P.R.: Mainland   CN  CHN
## 44        44                     Colombia   CO  COL
## 46        46       Congo, Dem. Rep. of the   CD  COD
## 48        48                  Cook Islands   CK  COK
## 51        51                          Cuba   CU  CUB
## 52        52                        Cyprus   CY  CYP
## 54        54                       Denmark   DK  DNK
## 56        56                      Dominica   DM  DMA
## 57        57                Dominican Rep.   DO  DOM
## 58        58                       Ecuador   EC  ECU
## 59        59           Egypt, Arab Rep. of   EG  EGY
## 60        60                   El Salvador   SV  SLV
## 64        64             Eswatini, Kingdom of   SZ  SWZ
## 67        67                  Faroe Islands   FO  FRO
## 68        68                  Fiji, Rep. of   FJ  FJI
## 69        69                        Finland   FI  FIN
## 70        70                         France   FR  FRA
## 71        71              French Polynesia   PF  PYF
## 72        72                          Gabon   GA  GAB
## 73        73                   Gambia, The   GM  GMB
## 75        75                        Germany   DE  DEU
## 76        76                          Ghana   GH  GHA
## 77        77                      Gibraltar   GI  GIB
## 78        78                         Greece   GR  GRC
## 79        79                      Greenland   GL  GRL
## 80        80                        Grenada   GD  GRD
## 81        81                     Guadeloupe   GP  GLP
## 82        82                      Guatemala   GT  GTM
## 83        83                         Guinea   GN  GIN
## 84        84                  Guinea-Bissau   GW  GNB
## 85        85                         Guyana   GY  GUY
```

```
## 86        86                        Haiti   HT  HTI
## 87        87                    Holy See    VA  VAT
## 88        88                     Honduras   HN  HND
## 89        89                      Hungary   HU  HUN
## 90        90                      Iceland   IS  ISL
## 91        91                        India   IN  IND
## 92        92                    Indonesia   ID  IDN
## 93        93         Iran, Islamic Rep. of   IR  IRN
## 94        94                         Iraq   IQ  IRQ
## 95        95                      Ireland   IE  IRL
## 96        96                  Isle of Man   IM  IMN
## 97        97                       Israel   IL  ISR
## 98        98                        Italy   IT  ITA
## 100      100                        Japan   JP  JPN
## 101      101                       Jordan   JO  JOR
## 103      103                        Kenya   KE  KEN
## 105      105  Korea, Dem. People's Rep. of   KP  PRK
## 106      106               Korea, Rep. of   KR  KOR
## 107      107                       Kuwait   KW  KWT
## 109      109        Lao People's Dem. Rep.   LA  LAO
## 111      111                      Lebanon   LB  LBN
## 112      112          Lesotho, Kingdom of   LS  LSO
## 113      113                      Liberia   LR  LBR
## 114      114                        Libya   LY  LBY
## 115      115                Liechtenstein   LI  LIE
## 118      118          Madagascar, Rep. of   MG  MDG
## 119      119                       Malawi   MW  MWI
## 120      120                     Malaysia   MY  MYS
## 122      122                         Mali   ML  MLI
## 123      123                        Malta   MT  MLT
## 125      125                   Martinique   MQ  MTQ
## 126      126   Mauritania, Islamic Rep. of   MR  MRT
## 127      127                    Mauritius   MU  MUS
## 129      129                       Mexico   MX  MEX
## 132      132                       Monaco   MC  MCO
## 133      133                     Mongolia   MN  MNG
## 136      136                      Morocco   MA  MAR
## 137      137          Mozambique, Rep. of   MZ  MOZ
## 138      138                      Myanmar   MM  MMR
## 141      141                        Nepal   NP  NPL
## 142      142             Netherlands, The   NL  NLD
## 143      143                New Caledonia   NC  NCL
## 144      144                  New Zealand   NZ  NZL
## 145      145                    Nicaragua   NI  NIC
## 146      146                        Niger   NE  NER
## 147      147                      Nigeria   NG  NGA
## 151      151                       Norway   NO  NOR
## 152      152                         Oman   OM  OMN
## 153      153                     Pakistan   PK  PAK
## 156      156              Papua New Guinea   PG  PNG
## 157      157                     Paraguay   PY  PRY
## 158      158                         Peru   PE  PER
## 159      159                  Philippines   PH  PHL
## 161      161               Poland, Rep. of   PL  POL
```

```
## 162      162                          Portugal   PT  PRT
## 163      163                       Puerto Rico   PR  PRI
## 164      164                             Qatar   QA  QAT
## 165      165                           Romania   RO  ROU
## 168      168                      Saint Helena   SH  SHN
## 169      169         Saint Pierre and Miquelon   PM  SPM
## 171      171              San Marino, Rep. of   SM  SMR
## 173      173                      Saudi Arabia   SA  SAU
## 174      174                           Senegal   SN  SEN
## 176      176                        Seychelles   SC  SYC
## 182      182                           Somalia   SO  SOM
## 183      183                      South Africa   ZA  ZAF
## 185      185                             Spain   ES  ESP
## 186      186                         Sri Lanka   LK  LKA
## 188      188                         St. Lucia   LC  LCA
## 189      189 St. Vincent and the Grenadines   VC  VCT
## 191      191                          Suriname   SR  SUR
## 192      192                            Sweden   SE  SWE
## 193      193                       Switzerland   CH  CHE
## 194      194                 Syrian Arab Rep.   SY  SYR
## 195      195         Taiwan Province of China   TW  TWN
## 197      197         Tanzania, United Rep. of   TZ  TZA
## 198      198                          Thailand   TH  THA
## 200      200                              Togo   TG  TGO
## 202      202                             Tonga   TO  TON
## 203      203               Trinidad and Tobago   TT  TTO
## 204      204                           Tunisia   TN  TUN
## 208      208                            Uganda   UG  UGA
## 210      210              United Arab Emirates   AE  ARE
## 211      211                    United Kingdom   GB  GBR
## 212      212                     United States   US  USA
## 213      213      United States Virgin Islands   VI  VIR
## 214      214                           Uruguay   UY  URY
## 216      216                           Vanuatu   VU  VUT
## 217      217 Venezuela, Rep. Bolivariana de   VE  VEN
## 218      218                           Vietnam   VN  VNM
## 219      219         Wallis and Futuna Islands   WF  WLF
## 220      220               West Bank and Gaza   PS  PSE
## 221      221                    Western Sahara   EH  ESH
## 222      222                             World       WLD
## 224      224                            Zambia   ZM  ZMB
## 225      225                          Zimbabwe   ZW  ZWE
##                                                                                                          Indicator
## 1    Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 2    Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 3    Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 5    Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 6    Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 7    Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 9    Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 12   Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 13   Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 15   Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 16   Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
```

```
## 17  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 21  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 22  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 23  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 24  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 26  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 27  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 28  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 29  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 30  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 31  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 34  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 35  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 36  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 38  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 39  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 40  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 41  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 42  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 43  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 44  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 46  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 48  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 51  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 52  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 54  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 56  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 57  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 58  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 59  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 60  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 64  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 67  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 68  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 69  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 70  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 71  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 72  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 73  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 75  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 76  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 77  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 78  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 79  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 80  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 81  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 82  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 83  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 84  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 85  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 86  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 87  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 88  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 89  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
```

```
## 90  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 91  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 92  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 93  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 94  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 95  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 96  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 97  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 98  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 100 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 101 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 103 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 105 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 106 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 107 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 109 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 111 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 112 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 113 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 114 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 115 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 118 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 119 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 120 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 122 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 123 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 125 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 126 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 127 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 129 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 132 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 133 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 136 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 137 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 138 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 141 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 142 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 143 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 144 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 145 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 146 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 147 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 151 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 152 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 153 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 156 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 157 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 158 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 159 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 161 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 162 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 163 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 164 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 165 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
```

```
## 168 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 169 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 171 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 173 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 174 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 176 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 182 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 183 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 185 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 186 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 188 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 189 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 191 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 192 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 193 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 194 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 195 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 197 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 198 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 200 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 202 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 203 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 204 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 208 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 210 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 211 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 212 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 213 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 214 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 216 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 217 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 218 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 219 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 220 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 221 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 222 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 224 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 225 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
##               Unit
## 1   Degree Celsius
## 2   Degree Celsius
## 3   Degree Celsius
## 5   Degree Celsius
## 6   Degree Celsius
## 7   Degree Celsius
## 9   Degree Celsius
## 12  Degree Celsius
## 13  Degree Celsius
## 15  Degree Celsius
## 16  Degree Celsius
## 17  Degree Celsius
## 21  Degree Celsius
## 22  Degree Celsius
## 23  Degree Celsius
```

```
## 24  Degree Celsius
## 26  Degree Celsius
## 27  Degree Celsius
## 28  Degree Celsius
## 29  Degree Celsius
## 30  Degree Celsius
## 31  Degree Celsius
## 34  Degree Celsius
## 35  Degree Celsius
## 36  Degree Celsius
## 38  Degree Celsius
## 39  Degree Celsius
## 40  Degree Celsius
## 41  Degree Celsius
## 42  Degree Celsius
## 43  Degree Celsius
## 44  Degree Celsius
## 46  Degree Celsius
## 48  Degree Celsius
## 51  Degree Celsius
## 52  Degree Celsius
## 54  Degree Celsius
## 56  Degree Celsius
## 57  Degree Celsius
## 58  Degree Celsius
## 59  Degree Celsius
## 60  Degree Celsius
## 64  Degree Celsius
## 67  Degree Celsius
## 68  Degree Celsius
## 69  Degree Celsius
## 70  Degree Celsius
## 71  Degree Celsius
## 72  Degree Celsius
## 73  Degree Celsius
## 75  Degree Celsius
## 76  Degree Celsius
## 77  Degree Celsius
## 78  Degree Celsius
## 79  Degree Celsius
## 80  Degree Celsius
## 81  Degree Celsius
## 82  Degree Celsius
## 83  Degree Celsius
## 84  Degree Celsius
## 85  Degree Celsius
## 86  Degree Celsius
## 87  Degree Celsius
## 88  Degree Celsius
## 89  Degree Celsius
## 90  Degree Celsius
## 91  Degree Celsius
## 92  Degree Celsius
## 93  Degree Celsius
```

```
## 94  Degree Celsius
## 95  Degree Celsius
## 96  Degree Celsius
## 97  Degree Celsius
## 98  Degree Celsius
## 100 Degree Celsius
## 101 Degree Celsius
## 103 Degree Celsius
## 105 Degree Celsius
## 106 Degree Celsius
## 107 Degree Celsius
## 109 Degree Celsius
## 111 Degree Celsius
## 112 Degree Celsius
## 113 Degree Celsius
## 114 Degree Celsius
## 115 Degree Celsius
## 118 Degree Celsius
## 119 Degree Celsius
## 120 Degree Celsius
## 122 Degree Celsius
## 123 Degree Celsius
## 125 Degree Celsius
## 126 Degree Celsius
## 127 Degree Celsius
## 129 Degree Celsius
## 132 Degree Celsius
## 133 Degree Celsius
## 136 Degree Celsius
## 137 Degree Celsius
## 138 Degree Celsius
## 141 Degree Celsius
## 142 Degree Celsius
## 143 Degree Celsius
## 144 Degree Celsius
## 145 Degree Celsius
## 146 Degree Celsius
## 147 Degree Celsius
## 151 Degree Celsius
## 152 Degree Celsius
## 153 Degree Celsius
## 156 Degree Celsius
## 157 Degree Celsius
## 158 Degree Celsius
## 159 Degree Celsius
## 161 Degree Celsius
## 162 Degree Celsius
## 163 Degree Celsius
## 164 Degree Celsius
## 165 Degree Celsius
## 168 Degree Celsius
## 169 Degree Celsius
## 171 Degree Celsius
## 173 Degree Celsius
```

```
## 174 Degree Celsius
## 176 Degree Celsius
## 182 Degree Celsius
## 183 Degree Celsius
## 185 Degree Celsius
## 186 Degree Celsius
## 188 Degree Celsius
## 189 Degree Celsius
## 191 Degree Celsius
## 192 Degree Celsius
## 193 Degree Celsius
## 194 Degree Celsius
## 195 Degree Celsius
## 197 Degree Celsius
## 198 Degree Celsius
## 200 Degree Celsius
## 202 Degree Celsius
## 203 Degree Celsius
## 204 Degree Celsius
## 208 Degree Celsius
## 210 Degree Celsius
## 211 Degree Celsius
## 212 Degree Celsius
## 213 Degree Celsius
## 214 Degree Celsius
## 216 Degree Celsius
## 217 Degree Celsius
## 218 Degree Celsius
## 219 Degree Celsius
## 220 Degree Celsius
## 221 Degree Celsius
## 222 Degree Celsius
## 224 Degree Celsius
## 225 Degree Celsius
##
## 1   Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 2   Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 3   Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 5   Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 6   Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 7   Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 9   Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 12  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 13  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 15  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 16  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 17  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 21  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 22  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 23  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 24  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 26  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 27  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 28  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
```

```
## 29  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 30  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 31  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 34  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 35  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 36  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 38  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 39  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 40  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 41  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 42  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 43  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 44  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 46  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 48  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 51  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 52  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 54  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 56  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 57  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 58  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 59  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 60  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 64  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 67  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 68  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 69  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 70  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 71  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 72  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 73  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 75  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 76  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 77  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 78  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 79  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 80  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 81  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 82  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 83  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 84  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 85  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 86  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 87  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 88  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 89  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 90  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 91  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 92  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 93  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 94  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 95  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 96  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 97  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
```

```
## 98  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 100 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 101 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 103 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 105 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 106 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 107 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 109 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 111 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 112 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 113 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 114 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 115 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 118 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 119 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 120 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 122 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 123 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 125 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 126 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 127 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 129 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 132 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 133 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 136 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 137 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 138 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 141 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 142 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 143 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 144 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 145 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 146 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 147 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 151 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 152 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 153 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 156 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 157 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 158 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 159 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 161 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 162 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 163 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 164 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 165 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 168 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 169 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 171 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 173 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 174 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 176 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 182 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 183 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
```

```
## 185 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 186 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 188 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 189 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 191 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 192 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 193 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 194 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 195 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 197 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 198 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 200 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 202 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 203 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 204 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 208 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 210 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 211 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 212 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 213 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 214 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 216 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 217 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 218 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 219 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 220 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 221 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 222 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 224 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
## 225 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clim
##     CTS_Code                    CTS_Name
## 1       ECCS Surface Temperature Change
## 2       ECCS Surface Temperature Change
## 3       ECCS Surface Temperature Change
## 5       ECCS Surface Temperature Change
## 6       ECCS Surface Temperature Change
## 7       ECCS Surface Temperature Change
## 9       ECCS Surface Temperature Change
## 12      ECCS Surface Temperature Change
## 13      ECCS Surface Temperature Change
## 15      ECCS Surface Temperature Change
## 16      ECCS Surface Temperature Change
## 17      ECCS Surface Temperature Change
## 21      ECCS Surface Temperature Change
## 22      ECCS Surface Temperature Change
## 23      ECCS Surface Temperature Change
## 24      ECCS Surface Temperature Change
## 26      ECCS Surface Temperature Change
## 27      ECCS Surface Temperature Change
## 28      ECCS Surface Temperature Change
## 29      ECCS Surface Temperature Change
## 30      ECCS Surface Temperature Change
## 31      ECCS Surface Temperature Change
## 34      ECCS Surface Temperature Change
```

```
## 35      ECCS Surface Temperature Change
## 36      ECCS Surface Temperature Change
## 38      ECCS Surface Temperature Change
## 39      ECCS Surface Temperature Change
## 40      ECCS Surface Temperature Change
## 41      ECCS Surface Temperature Change
## 42      ECCS Surface Temperature Change
## 43      ECCS Surface Temperature Change
## 44      ECCS Surface Temperature Change
## 46      ECCS Surface Temperature Change
## 48      ECCS Surface Temperature Change
## 51      ECCS Surface Temperature Change
## 52      ECCS Surface Temperature Change
## 54      ECCS Surface Temperature Change
## 56      ECCS Surface Temperature Change
## 57      ECCS Surface Temperature Change
## 58      ECCS Surface Temperature Change
## 59      ECCS Surface Temperature Change
## 60      ECCS Surface Temperature Change
## 64      ECCS Surface Temperature Change
## 67      ECCS Surface Temperature Change
## 68      ECCS Surface Temperature Change
## 69      ECCS Surface Temperature Change
## 70      ECCS Surface Temperature Change
## 71      ECCS Surface Temperature Change
## 72      ECCS Surface Temperature Change
## 73      ECCS Surface Temperature Change
## 75      ECCS Surface Temperature Change
## 76      ECCS Surface Temperature Change
## 77      ECCS Surface Temperature Change
## 78      ECCS Surface Temperature Change
## 79      ECCS Surface Temperature Change
## 80      ECCS Surface Temperature Change
## 81      ECCS Surface Temperature Change
## 82      ECCS Surface Temperature Change
## 83      ECCS Surface Temperature Change
## 84      ECCS Surface Temperature Change
## 85      ECCS Surface Temperature Change
## 86      ECCS Surface Temperature Change
## 87      ECCS Surface Temperature Change
## 88      ECCS Surface Temperature Change
## 89      ECCS Surface Temperature Change
## 90      ECCS Surface Temperature Change
## 91      ECCS Surface Temperature Change
## 92      ECCS Surface Temperature Change
## 93      ECCS Surface Temperature Change
## 94      ECCS Surface Temperature Change
## 95      ECCS Surface Temperature Change
## 96      ECCS Surface Temperature Change
## 97      ECCS Surface Temperature Change
## 98      ECCS Surface Temperature Change
## 100     ECCS Surface Temperature Change
## 101     ECCS Surface Temperature Change
## 103     ECCS Surface Temperature Change
```

```
## 105     ECCS Surface Temperature Change
## 106     ECCS Surface Temperature Change
## 107     ECCS Surface Temperature Change
## 109     ECCS Surface Temperature Change
## 111     ECCS Surface Temperature Change
## 112     ECCS Surface Temperature Change
## 113     ECCS Surface Temperature Change
## 114     ECCS Surface Temperature Change
## 115     ECCS Surface Temperature Change
## 118     ECCS Surface Temperature Change
## 119     ECCS Surface Temperature Change
## 120     ECCS Surface Temperature Change
## 122     ECCS Surface Temperature Change
## 123     ECCS Surface Temperature Change
## 125     ECCS Surface Temperature Change
## 126     ECCS Surface Temperature Change
## 127     ECCS Surface Temperature Change
## 129     ECCS Surface Temperature Change
## 132     ECCS Surface Temperature Change
## 133     ECCS Surface Temperature Change
## 136     ECCS Surface Temperature Change
## 137     ECCS Surface Temperature Change
## 138     ECCS Surface Temperature Change
## 141     ECCS Surface Temperature Change
## 142     ECCS Surface Temperature Change
## 143     ECCS Surface Temperature Change
## 144     ECCS Surface Temperature Change
## 145     ECCS Surface Temperature Change
## 146     ECCS Surface Temperature Change
## 147     ECCS Surface Temperature Change
## 151     ECCS Surface Temperature Change
## 152     ECCS Surface Temperature Change
## 153     ECCS Surface Temperature Change
## 156     ECCS Surface Temperature Change
## 157     ECCS Surface Temperature Change
## 158     ECCS Surface Temperature Change
## 159     ECCS Surface Temperature Change
## 161     ECCS Surface Temperature Change
## 162     ECCS Surface Temperature Change
## 163     ECCS Surface Temperature Change
## 164     ECCS Surface Temperature Change
## 165     ECCS Surface Temperature Change
## 168     ECCS Surface Temperature Change
## 169     ECCS Surface Temperature Change
## 171     ECCS Surface Temperature Change
## 173     ECCS Surface Temperature Change
## 174     ECCS Surface Temperature Change
## 176     ECCS Surface Temperature Change
## 182     ECCS Surface Temperature Change
## 183     ECCS Surface Temperature Change
## 185     ECCS Surface Temperature Change
## 186     ECCS Surface Temperature Change
## 188     ECCS Surface Temperature Change
## 189     ECCS Surface Temperature Change
```

```
## 191     ECCS Surface Temperature Change
## 192     ECCS Surface Temperature Change
## 193     ECCS Surface Temperature Change
## 194     ECCS Surface Temperature Change
## 195     ECCS Surface Temperature Change
## 197     ECCS Surface Temperature Change
## 198     ECCS Surface Temperature Change
## 200     ECCS Surface Temperature Change
## 202     ECCS Surface Temperature Change
## 203     ECCS Surface Temperature Change
## 204     ECCS Surface Temperature Change
## 208     ECCS Surface Temperature Change
## 210     ECCS Surface Temperature Change
## 211     ECCS Surface Temperature Change
## 212     ECCS Surface Temperature Change
## 213     ECCS Surface Temperature Change
## 214     ECCS Surface Temperature Change
## 216     ECCS Surface Temperature Change
## 217     ECCS Surface Temperature Change
## 218     ECCS Surface Temperature Change
## 219     ECCS Surface Temperature Change
## 220     ECCS Surface Temperature Change
## 221     ECCS Surface Temperature Change
## 222     ECCS Surface Temperature Change
## 224     ECCS Surface Temperature Change
## 225     ECCS Surface Temperature Change
##                                                                CTS_Full_Descriptor
## 1   Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 2   Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 3   Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 5   Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 6   Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 7   Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 9   Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 12  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 13  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 15  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 16  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 17  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 21  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 22  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 23  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 24  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 26  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 27  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 28  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 29  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 30  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 31  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 34  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 35  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 36  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 38  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 39  Environment, Climate Change, Climate Indicators, Surface Temperature Change
```

```
## 40  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 41  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 42  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 43  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 44  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 46  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 48  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 51  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 52  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 54  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 56  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 57  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 58  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 59  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 60  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 64  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 67  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 68  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 69  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 70  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 71  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 72  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 73  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 75  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 76  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 77  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 78  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 79  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 80  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 81  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 82  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 83  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 84  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 85  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 86  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 87  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 88  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 89  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 90  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 91  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 92  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 93  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 94  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 95  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 96  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 97  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 98  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 100 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 101 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 103 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 105 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 106 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 107 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 109 Environment, Climate Change, Climate Indicators, Surface Temperature Change
```

```
## 111 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 112 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 113 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 114 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 115 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 118 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 119 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 120 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 122 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 123 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 125 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 126 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 127 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 129 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 132 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 133 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 136 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 137 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 138 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 141 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 142 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 143 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 144 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 145 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 146 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 147 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 151 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 152 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 153 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 156 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 157 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 158 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 159 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 161 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 162 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 163 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 164 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 165 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 168 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 169 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 171 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 173 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 174 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 176 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 182 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 183 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 185 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 186 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 188 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 189 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 191 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 192 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 193 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 194 Environment, Climate Change, Climate Indicators, Surface Temperature Change
```

```
## 195 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 197 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 198 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 200 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 202 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 203 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 204 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 208 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 210 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 211 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 212 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 213 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 214 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 216 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 217 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 218 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 219 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 220 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 221 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 222 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 224 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 225 Environment, Climate Change, Climate Indicators, Surface Temperature Change
##      F1961  F1962  F1963  F1964  F1965  F1966  F1967  F1968  F1969  F1970
## 1   -0.113 -0.164  0.847 -0.764 -0.244  0.226 -0.371 -0.423 -0.539  0.813
## 2    0.627  0.326  0.075 -0.166 -0.388  0.559 -0.074  0.081 -0.013 -0.106
## 3    0.164  0.114  0.077  0.250 -0.100  0.433 -0.026 -0.067  0.291  0.116
## 5    0.736  0.112 -0.752  0.308 -0.490  0.415  0.637  0.018 -0.137  0.121
## 6    0.041 -0.152 -0.190 -0.229 -0.196  0.175 -0.081 -0.193  0.188  0.248
## 7    0.086 -0.024  0.234  0.189 -0.365 -0.001 -0.257 -0.200  0.317  0.082
## 9    0.122 -0.046  0.162 -0.343  0.090 -0.163  0.000  0.472  0.292  0.438
## 12   0.157  0.126 -0.096 -0.012  0.140 -0.230 -0.093 -0.203  0.103 -0.007
## 13   1.031 -0.621 -0.727 -0.371 -0.883  0.602  0.676  0.211 -0.126 -0.550
## 15   0.073 -0.062 -0.097  0.192  0.054 -0.172 -0.146 -0.324 -0.065 -0.469
## 16  -0.471  0.397  0.635 -0.561  0.234  0.535 -0.362 -0.446  0.567  0.247
## 17   0.152 -0.265 -0.090  0.107 -0.195  0.308 -0.226 -0.236 -0.007 -0.021
## 21  -0.001 -0.137 -0.060 -0.055 -0.105 -0.195 -0.297 -0.205  0.260 -0.210
## 22  -0.137 -0.240  0.152 -0.218 -0.094 -0.007 -0.252 -0.129  0.303  0.305
## 23   0.213 -0.292 -0.220  0.065 -0.565  0.140 -0.378 -0.478  0.102 -0.027
## 24   0.247  0.012  0.409 -0.123  0.220 -0.083  0.332 -0.162  0.522  0.173
## 26   0.151  0.262 -0.472 -0.057  0.098  0.436 -0.458 -0.195  0.197  0.598
## 27   0.167 -0.184  0.158 -0.213 -0.075  0.044  0.073 -0.409  0.331  0.130
## 28   0.093 -0.072  0.189  0.184 -0.338 -0.110 -0.321 -0.145  0.356  0.051
## 29   0.062 -0.017 -0.165  0.054 -0.235  0.183 -0.093 -0.177  0.227  0.086
## 30   0.903  0.488 -0.248 -0.528 -0.456  1.151  0.027  0.421 -0.485  0.205
## 31  -0.285 -0.208  0.168 -0.218 -0.141 -0.147 -0.174 -0.209  0.543  0.359
## 34  -0.035 -0.134 -0.309  0.156 -0.196  0.433 -0.089 -0.124  0.478  0.069
## 35  -0.117 -0.218  0.126 -0.157 -0.110 -0.010 -0.107 -0.122  0.225  0.175
## 36   0.057 -0.118  0.335 -0.299 -0.867 -0.152 -0.452  0.476 -0.003  0.426
## 38  -0.003 -0.306  0.037 -0.136 -0.050  0.064 -0.229 -0.168  0.143  0.245
## 39  -0.409 -0.260  0.291 -0.176 -0.092 -0.007 -0.377 -0.155  0.553  0.163
## 40  -0.301  0.249  0.054 -0.220  0.115 -0.169 -0.142  0.366  0.155  0.205
## 41   0.055 -0.056  0.330  0.117  0.151  0.652  0.044 -0.654 -0.009 -0.398
## 42   0.055 -0.056  0.330  0.117  0.151  0.652  0.044 -0.654 -0.009 -0.398
## 43   0.259 -0.141  0.289 -0.026  0.078  0.181 -0.282 -0.408 -0.211 -0.300
```

```
## 44   0.090 -0.133 -0.058  0.117 -0.217  0.117 -0.274 -0.238  0.363  0.052
## 46  -0.030 -0.172 -0.038 -0.112 -0.193  0.109 -0.119 -0.158  0.139  0.218
## 48   0.148 -0.064 -0.099  0.163 -0.373  0.035 -0.352 -0.387 -0.009  0.249
## 51  -0.084 -0.070 -0.127  0.102  0.023 -0.325 -0.234 -0.339  0.024 -0.349
## 52   0.039  0.789  0.691 -0.612 -0.208  0.637 -0.774 -0.031  0.165  0.495
## 54   1.117 -0.641 -1.019 -0.274 -0.603 -0.500  0.831  0.277 -0.135 -1.204
## 56  -0.033  0.146  0.256  0.081 -0.297  0.104 -0.230 -0.222  0.382  0.181
## 57  -0.009 -0.070 -0.017  0.167 -0.314 -0.028 -0.202 -0.154  0.310 -0.052
## 58  -0.108 -0.218 -0.062 -0.239  0.111  0.042 -0.422 -0.346  0.442 -0.131
## 59  -0.241  0.640  0.628 -0.373 -0.104  0.447 -0.678 -0.126  0.451 -0.114
## 60  -0.073 -0.248 -0.157 -0.026 -0.074  0.115 -0.423 -0.319  0.280 -0.031
## 64   0.268  0.433 -0.210  0.022 -0.224  0.295 -0.274 -0.431  0.346  0.500
## 67   0.630 -0.480 -0.056  0.478 -0.354 -0.393 -0.120 -0.250 -0.344 -0.510
## 68   0.219 -0.083 -0.046  0.185 -0.643 -0.293 -0.286 -0.103 -0.075  0.118
## 69   1.892 -0.339 -0.401  0.338 -0.263 -1.801  1.088 -1.634 -0.478 -0.629
## 70   0.827 -0.301 -0.955  0.025 -0.625  0.421  0.494 -0.073  0.024 -0.092
## 71   0.207 -0.046  0.037 -0.137 -0.083  0.081 -0.274 -0.516  0.301  0.182
## 72  -0.139 -0.063  0.232 -0.148 -0.164  0.140 -0.127 -0.138  0.110  0.142
## 73  -0.138 -0.047  0.130 -0.192 -0.463 -0.086 -0.381 -0.547  0.832  0.399
## 75   0.990 -0.750 -1.084 -0.328 -0.814  0.407  0.868  0.204 -0.111 -0.832
## 76  -0.070 -0.154  0.141 -0.233 -0.170  0.068 -0.232 -0.170  0.266  0.302
## 77   0.595  0.536  0.022  0.483 -0.087  0.228 -0.125  0.016 -0.310 -0.048
## 78   0.479  0.619  0.305 -0.301 -0.322  0.790 -0.194  0.182 -0.090  0.269
## 79  -0.295  0.842  0.308  0.257  0.800 -0.212 -0.371 -0.260 -0.252 -0.224
## 80   0.114  0.053  0.309 -0.052 -0.196  0.065 -0.233 -0.139  0.504  0.299
## 81   0.041  0.048  0.249  0.150 -0.341  0.051 -0.238 -0.211  0.337  0.123
## 82  -0.045 -0.131 -0.096 -0.052 -0.066 -0.057 -0.366 -0.337  0.413 -0.106
## 83  -0.145 -0.137  0.160 -0.180 -0.095 -0.003 -0.237 -0.151  0.459  0.345
## 84  -0.130 -0.071  0.157 -0.227 -0.383 -0.046 -0.269 -0.432  0.723  0.345
## 85   0.043 -0.009 -0.188  0.320 -0.065  0.212 -0.083 -0.274  0.439  0.489
## 86  -0.012 -0.049 -0.111  0.223 -0.310 -0.025 -0.209 -0.272  0.174 -0.123
## 87   0.735  0.079 -0.137  0.199 -0.415  0.264  0.169  0.036  0.002 -0.130
## 88  -0.058 -0.162 -0.229 -0.029 -0.055  0.006 -0.286 -0.319  0.243 -0.124
## 89   1.176 -0.419 -0.463 -0.877 -0.883  0.755  0.594  0.383 -0.276 -0.508
## 90   0.547 -0.270 -0.091  1.097 -0.131 -0.498 -0.597 -0.635 -0.900 -0.617
## 91  -0.208 -0.479 -0.030 -0.030 -0.072  0.290 -0.210 -0.234  0.303  0.033
## 92  -0.096 -0.030 -0.134 -0.036 -0.257  0.025 -0.163 -0.069  0.151  0.129
## 93  -0.068  0.263  0.755 -0.667 -0.280  0.748 -0.271 -0.246 -0.342  0.978
## 94  -0.189  0.885  0.433 -0.810 -0.134  0.964 -0.843 -0.275  0.241  0.661
## 95   0.264 -0.688 -0.773  0.158 -0.554 -0.033 -0.009  0.072 -0.265  0.060
## 96   0.358 -0.746 -0.820  0.095 -0.579 -0.100  0.105  0.035 -0.287  0.049
## 97  -0.106  0.826  0.842 -0.622 -0.031  0.610 -0.928 -0.118  0.238  0.184
## 98   0.805  0.025 -0.365  0.131 -0.431  0.307  0.301  0.011 -0.107 -0.153
## 100  0.668  0.125 -0.053  0.266 -0.519  0.019  0.034 -0.498 -0.049 -0.381
## 101 -0.189  0.983  0.784 -0.655 -0.005  0.742 -1.048 -0.129  0.383  0.196
## 103  0.258 -0.242 -0.191 -0.442 -0.299  0.062 -0.064 -0.641  0.086  0.181
## 105  0.495 -0.055 -0.105  0.238 -0.208 -0.065  0.165 -0.467 -0.455 -0.379
## 106  0.637 -0.094 -0.472  0.608 -0.178  0.099  0.170 -0.678 -0.288 -0.491
## 107 -0.225  0.800  0.485 -0.781  0.051  0.776 -0.621 -0.253  0.375  0.514
## 109  0.049 -0.271 -0.412 -0.077 -0.176  0.453 -0.123 -0.128  0.514 -0.021
## 111  0.002  0.852  0.749 -0.719 -0.090  0.683 -0.944 -0.089  0.223  0.389
## 112  0.371  0.272  0.026  0.007 -0.078  0.237 -0.106 -0.366  0.505  0.502
## 113 -0.095 -0.074  0.154 -0.133 -0.259  0.050 -0.149 -0.076  0.147  0.272
## 114 -0.473  0.208  0.230 -0.051 -0.077  0.251 -0.557  0.008  0.815 -0.223
```

```
## 115  1.052 -0.483 -0.775  0.058 -0.840  0.407  0.545  0.013 -0.015 -0.553
## 118  0.522 -0.117 -0.310 -0.397 -0.588 -0.060  0.308 -0.418  0.406  0.228
## 119  0.314 -0.149 -0.427 -0.267 -0.572  0.149  0.090 -0.271  0.290  0.164
## 120 -0.070 -0.085 -0.107  0.036 -0.231  0.131 -0.134 -0.108  0.225  0.115
## 122 -0.301 -0.145  0.213 -0.130 -0.299  0.005 -0.124 -0.287  0.665  0.365
## 123  0.551  0.350 -0.204  0.260 -0.218  0.149  0.131 -0.033 -0.129 -0.144
## 125 -0.040  0.151  0.243  0.062 -0.283  0.067 -0.246 -0.213  0.403  0.186
## 126 -0.047  0.140  0.103  0.057 -0.530  0.112 -0.248 -0.481  0.612  0.701
## 127  0.524 -0.111 -0.155 -0.246 -0.208 -0.019  0.120 -0.213  0.296  0.333
## 129 -0.145  0.190  0.230 -0.284 -0.057 -0.238 -0.098 -0.414  0.179 -0.300
## 132  0.739 -0.048 -0.631  0.408 -0.464  0.210  0.432  0.013 -0.228 -0.017
## 133  0.170 -0.106  1.202 -0.174  0.857  0.371 -0.458 -0.813 -0.861 -0.306
## 136  0.570  0.401  0.179  0.486 -0.286  0.433 -0.032 -0.151  0.030  0.108
## 137  0.391  0.031 -0.435 -0.180 -0.596  0.143  0.120 -0.373  0.289  0.228
## 138 -0.024 -0.112 -0.169  0.036 -0.315  0.377 -0.058 -0.170  0.187 -0.044
## 141  0.130 -0.448 -0.184  0.177 -0.356  0.247 -0.254 -0.394  0.119  0.128
## 142  0.852 -0.908 -1.270 -0.337 -0.728  0.273  0.757  0.156 -0.007 -0.590
## 143 -0.248  0.081 -0.211  0.164 -0.806 -0.638  0.032 -0.429 -0.167  0.454
## 144 -0.282  0.581 -0.356 -0.455 -0.451 -0.233 -0.184 -0.086 -0.374  0.596
## 145 -0.089 -0.329 -0.203 -0.107  0.041  0.185 -0.269 -0.235  0.291 -0.206
## 146 -0.694 -0.135  0.434 -0.261 -0.007 -0.092 -0.364  0.080  0.766  0.051
## 147 -0.241 -0.247  0.271 -0.257 -0.037 -0.063 -0.317 -0.035  0.393  0.218
## 151  1.239 -0.776 -0.130  0.373 -0.264 -1.642  0.558 -0.937 -0.173 -0.695
## 152 -0.274  0.338  0.393 -0.478 -0.315  0.180  0.034 -0.614  0.247  0.855
## 153 -0.272 -0.242  0.422 -0.379 -0.279 -0.142 -0.319 -0.470  0.247  0.556
## 156 -0.162  0.241  0.009  0.105 -0.493 -0.070 -0.220 -0.037  0.123  0.201
## 157  0.563 -0.663  0.903 -0.238 -0.079 -0.088  0.481 -0.041  0.384  0.261
## 158  0.001 -0.116  0.085 -0.203  0.200  0.095 -0.250 -0.312  0.509  0.002
## 159 -0.143 -0.113 -0.357 -0.040 -0.290  0.165 -0.148 -0.115  0.132  0.203
## 161  1.397 -0.515 -0.885 -0.720 -1.064  0.554  1.134  0.458 -0.493 -1.288
## 162  0.815  0.524 -0.086  0.519 -0.230  0.280 -0.041  0.033 -0.342  0.071
## 163 -0.011 -0.098  0.129  0.106 -0.384 -0.044 -0.241 -0.252  0.383  0.021
## 164 -0.542  0.518  0.449 -0.400  0.386  0.439 -0.252 -0.536  0.668  0.267
## 165  1.075  0.169 -0.301 -0.791 -0.674  1.053  0.284  0.432 -0.589 -0.053
## 168  0.144 -0.070  0.040 -0.026 -0.145  0.055 -0.306  0.195  0.045 -0.258
## 169 -0.040 -0.121 -0.190 -0.529 -0.510  0.099  0.183  0.053  0.562  0.953
## 171  0.925 -0.116 -0.388 -0.098 -0.406  0.403  0.385 -0.028 -0.103 -0.096
## 173 -0.157  0.688  0.488 -0.470  0.160  0.650 -0.690 -0.391  0.529  0.363
## 174 -0.185 -0.023  0.082 -0.212 -0.449 -0.079 -0.433 -0.520  0.763  0.557
## 176  0.317  0.088 -0.077 -0.164 -0.531  0.070  0.032 -0.148  0.209  0.320
## 182  0.333 -0.028 -0.211  0.027 -0.388  0.173 -0.090 -0.591  0.018  0.079
## 183  0.251  0.215  0.185 -0.072 -0.025  0.246 -0.073 -0.376  0.287  0.365
## 185  0.728  0.411 -0.233  0.486 -0.200  0.392  0.146  0.093 -0.285  0.131
## 186 -0.105 -0.092 -0.029  0.070 -0.145  0.213 -0.082 -0.066  0.229  0.125
## 188  0.049  0.111  0.258  0.003 -0.245  0.025 -0.249 -0.201  0.436  0.216
## 189  0.108  0.063  0.307 -0.051 -0.197  0.062 -0.238 -0.139  0.504  0.297
## 191 -0.067 -0.046 -0.055  0.047  0.001  0.242 -0.092 -0.277  0.507  0.220
## 192  1.563 -0.690 -0.458  0.393 -0.223 -1.672  0.830 -0.929 -0.207 -1.098
## 193  0.988 -0.357 -0.870  0.137 -0.791  0.466  0.554 -0.062 -0.079 -0.486
## 194 -0.025  0.998  0.543 -0.709 -0.183  0.923 -1.028 -0.187  0.154  0.637
## 195  0.158 -0.160 -0.211  0.251 -0.144  0.288  0.088 -0.935  0.010 -0.336
## 197  0.334 -0.260 -0.270 -0.397 -0.242  0.050  0.027 -0.474  0.350  0.193
## 198 -0.176 -0.164 -0.328 -0.041 -0.228  0.406 -0.058 -0.128  0.464  0.015
## 200 -0.066 -0.156  0.101 -0.145 -0.074  0.121 -0.231 -0.142  0.261  0.305
```

```
## 202  0.333 -0.183 -0.283  0.239 -0.606 -0.411 -0.210  0.007 -0.203  0.409
## 203  0.188 -0.139  0.299 -0.068 -0.151  0.151 -0.107 -0.171  0.508  0.339
## 204  0.274  0.152 -0.075  0.347 -0.127  0.535  0.023  0.078  0.058 -0.200
## 208 -0.032 -0.295 -0.183 -0.236 -0.117 -0.007 -0.090 -0.268  0.122  0.037
## 210 -0.285  0.538  0.369 -0.287  0.211  0.276 -0.057 -0.616  0.574  0.422
## 211  0.491 -0.734 -0.868  0.025 -0.575 -0.137  0.220 -0.070 -0.213 -0.076
## 212  0.003 -0.026  0.418 -0.282 -0.362 -0.214  0.076 -0.073 -0.267 -0.030
## 213  0.069 -0.082  0.172  0.154 -0.352 -0.089 -0.307 -0.191  0.369  0.051
## 214  0.398 -0.473  0.330 -0.762  0.180 -0.421  0.019  0.385  0.149  0.374
## 216  0.168  0.092 -0.165  0.220 -0.569 -0.270 -0.144 -0.288  0.013  0.299
## 217  0.072 -0.113 -0.012  0.097 -0.096  0.189 -0.199 -0.173  0.514  0.217
## 218  0.014 -0.240 -0.302  0.082 -0.017  0.488 -0.129 -0.304  0.535 -0.062
## 219  0.323 -0.051  0.125  0.187 -0.410  0.048 -0.255 -0.096 -0.210  0.053
## 220 -0.110  0.822  0.848 -0.626 -0.031  0.604 -0.934 -0.110  0.230  0.187
## 221  0.632  0.576  0.333  0.819 -0.337  0.284 -0.026 -0.368  0.383  0.543
## 222  0.211  0.038  0.168 -0.246 -0.223  0.201 -0.117 -0.126 -0.092  0.150
## 224  0.228 -0.168 -0.390 -0.279 -0.418  0.300 -0.014 -0.130  0.243  0.351
## 225  0.267  0.237 -0.458 -0.097 -0.480  0.215 -0.043  0.093  0.215  0.421
##      F1971  F1972  F1973  F1974  F1975  F1976  F1977  F1978  F1979  F1980
## 1    0.619 -1.124  0.232 -0.489 -0.445 -0.286  0.513  0.129  0.361  0.600
## 2   -0.195 -0.069 -0.288 -0.139 -0.211 -0.683  0.545 -0.814  0.203 -0.414
## 3   -0.385 -0.348 -0.015 -0.503 -0.539 -0.782  0.504  0.012  0.654  0.232
## 5   -0.326 -0.499  0.025 -0.371  0.246 -0.045 -0.093 -0.163  0.058 -0.188
## 6   -0.097 -0.035  0.475 -0.158 -0.029 -0.313  0.272  0.037  0.291  0.279
## 7   -0.269 -0.179  0.170 -0.370 -0.334 -0.426  0.096  0.130  0.034  0.698
## 9   -0.260 -0.008 -0.139 -0.106 -0.021 -0.321  0.432  0.362  0.266  0.373
## 12  -0.044  0.091  0.831 -0.354  0.048 -0.522  0.176  0.062  0.375  0.887
## 13  -0.060  0.103 -0.033  0.314  0.860  0.216  0.499 -0.476 -0.112 -0.274
## 15  -0.055  0.301  0.166 -0.058  0.334 -0.241 -0.040  0.040  0.133  0.377
## 16  -0.248 -0.613 -0.273 -0.256 -0.217 -0.501  0.332  0.099  0.856  0.351
## 17  -0.579 -0.012  0.168 -0.125 -0.102 -0.104 -0.275 -0.216  0.495  0.128
## 21  -0.275  0.442  0.347  0.101 -0.059 -0.416  0.134 -0.025  0.524  0.576
## 22  -0.183  0.080  0.627  0.089 -0.274 -0.194  0.357 -0.045  0.499  0.425
## 23  -0.227 -0.014  0.310  0.188  0.103 -0.042 -0.059 -0.213  0.414  0.081
## 24  -0.583  0.130  0.227 -0.154 -0.087 -0.249  0.276  0.270  0.181  0.176
## 26  -0.126 -0.475  0.602 -0.746 -0.225 -0.717  0.300 -0.065  0.543 -0.038
## 27  -0.134  0.114  0.443 -0.179 -0.140 -0.185  0.252  0.030  0.017  0.313
## 28  -0.274 -0.136  0.214 -0.353 -0.218 -0.368  0.123  0.109 -0.050  0.750
## 29  -0.248  0.018  0.255 -0.151  0.004 -0.337 -0.075  0.123  0.275  0.185
## 30  -0.139  0.136 -0.426 -0.198  0.390 -0.838  0.563 -0.710  0.165 -0.448
## 31  -0.019  0.135  0.671 -0.056 -0.311 -0.316  0.267  0.212  0.434  0.805
## 34  -0.468  0.007  0.360 -0.343 -0.019 -0.485  0.104  0.290  0.479  0.417
## 35  -0.132  0.055  0.566 -0.076 -0.207 -0.163  0.304  0.056  0.400  0.350
## 36  -0.023 -1.796  0.306 -0.846  0.225  0.083  1.079 -0.605 -0.214  0.917
## 38  -0.055  0.064  0.545 -0.058 -0.049 -0.117  0.203  0.044  0.380  0.439
## 39  -0.241  0.206  0.719 -0.032 -0.172  0.232 -0.048 -0.132  0.459  0.337
## 40  -0.364 -0.130 -0.058 -0.180 -0.127 -0.262  0.370  0.366  0.286  0.342
## 41  -0.187 -0.141  0.426 -0.342  0.161 -0.769  0.167  0.016  0.029  0.244
## 42  -0.187 -0.141  0.426 -0.342  0.161 -0.769  0.167  0.016  0.029  0.244
## 43   0.038  0.012  0.412 -0.008  0.278 -0.396 -0.057  0.242  0.299  0.251
## 44  -0.431 -0.022  0.349 -0.306 -0.304 -0.240  0.214  0.109  0.191  0.446
## 46  -0.141  0.074  0.458 -0.077 -0.103 -0.185  0.259  0.141  0.400  0.311
## 48  -0.079 -0.030  0.508 -0.129 -0.167 -0.269  0.057 -0.006 -0.050  0.138
## 51   0.067  0.433  0.403  0.087  0.528 -0.194  0.131  0.034  0.349  0.490
```

```
## 52  -0.256 -0.625 -0.379 -0.177 -0.225 -0.713  0.150 -0.028  0.607 -0.295
## 54   0.261  0.289  0.670  0.580  1.335  0.301 -0.014  0.145 -1.191 -0.441
## 56  -0.218 -0.083  0.163 -0.396 -0.392 -0.434  0.045  0.086  0.163  0.430
## 57  -0.318 -0.103  0.364 -0.438 -0.026 -0.337  0.405  0.330  0.181  0.692
## 58  -0.569  0.550  0.124 -0.246 -0.314  0.320  0.341  0.237  0.514  0.496
## 59  -0.257 -0.049 -0.304 -0.120 -0.482 -0.299 -0.119 -0.273  0.585 -0.080
## 60  -0.270  0.395  0.402 -0.311  0.057 -0.212  0.451  0.157  0.462  0.395
## 64  -0.002 -0.395  0.112 -0.233 -0.353 -0.436  0.305  0.188  0.234 -0.130
## 67   0.245  0.672 -0.049  0.501 -0.024  0.508 -0.311 -0.110 -0.873  0.041
## 68   0.157 -0.208  0.446  0.221  0.227 -0.004 -0.079 -0.002  0.154  0.195
## 69  -0.452  0.933  1.138  1.121  1.893 -0.877 -0.227 -0.526 -0.755 -0.380
## 70  -0.161 -0.325  0.059 -0.081  0.483  0.368  0.015 -0.216 -0.187 -0.217
## 71  -0.342  0.119  0.325 -0.342 -0.247 -0.250  0.243 -0.074  0.105  0.225
## 72  -0.053 -0.064  0.468 -0.084 -0.126 -0.335  0.185  0.069  0.385  0.307
## 73  -0.054  0.311  0.685 -0.212 -0.164 -0.057  0.489  0.422  0.630  0.820
## 75   0.032 -0.014  0.188  0.318  1.099  0.470  0.283 -0.173 -0.640 -0.186
## 76  -0.145  0.024  0.564  0.011 -0.228 -0.353  0.296  0.067  0.561  0.446
## 77  -0.810 -0.865 -0.157 -0.369 -0.177 -0.469 -0.144  0.213  0.396  0.312
## 78  -0.222 -0.177 -0.357 -0.193 -0.250 -0.916  0.330 -0.555  0.179 -0.379
## 79  -0.784 -0.841 -0.987  0.306 -1.093 -0.259  0.760 -0.682  0.498  0.919
## 80  -0.303 -0.117  0.073 -0.447 -0.396 -0.240 -0.127  0.067  0.274  0.212
## 81  -0.245 -0.147  0.167 -0.381 -0.366 -0.434  0.074  0.117  0.099  0.590
## 82  -0.141  0.429  0.458 -0.281  0.137 -0.392  0.225  0.128  0.332  0.432
## 83  -0.131  0.203  0.579 -0.063 -0.248 -0.242  0.203  0.192  0.491  0.636
## 84  -0.059  0.263  0.579 -0.150 -0.195 -0.109  0.358  0.294  0.487  0.645
## 85  -0.486 -0.024  0.084 -0.462 -0.301 -0.354  0.083 -0.028  0.341  0.322
## 86  -0.170  0.015  0.356 -0.342  0.220 -0.431  0.353  0.191  0.219  0.637
## 87  -0.258 -0.165  0.020 -0.213 -0.133 -0.412  0.317 -0.585  0.115 -0.530
## 88  -0.161  0.269  0.507 -0.327  0.068 -0.248  0.337  0.250  0.407  0.434
## 89  -0.063  0.390 -0.033  0.263  0.857 -0.274  0.549 -0.871  0.047 -0.620
## 90  -0.005  0.777 -0.099  0.522 -0.420  0.377 -0.258  0.054 -1.239  0.407
## 91  -0.519  0.012  0.332  0.034 -0.308  0.003  0.155 -0.150  0.305  0.401
## 92  -0.150 -0.054  0.264 -0.111 -0.131 -0.012  0.118  0.176  0.235  0.290
## 93   0.097 -0.959 -0.199 -0.677 -0.218 -0.555  0.394  0.274  0.684  0.540
## 94  -0.178 -0.731 -0.245 -0.434 -0.239 -0.777  0.313  0.162  1.264  0.058
## 95   0.342 -0.268  0.362 -0.211  0.701  0.561 -0.279  0.257 -0.687 -0.057
## 96   0.316 -0.190  0.297 -0.200  0.697  0.661 -0.339  0.209 -0.777 -0.031
## 97  -0.353 -0.513 -0.481 -0.260 -0.414 -0.577  0.005 -0.079  0.607 -0.202
## 98  -0.149 -0.132  0.034 -0.115  0.075 -0.320  0.283 -0.537  0.022 -0.421
## 100 -0.334  0.227  0.325 -0.488  0.041 -0.506 -0.154  0.232  0.458 -0.206
## 101 -0.405 -0.626 -0.491 -0.334 -0.507 -0.726 -0.001 -0.005  0.770 -0.113
## 103 -0.272  0.216  0.535 -0.069 -0.067  0.229  0.216 -0.023  0.055  0.561
## 105 -0.282 -0.171  0.614 -0.486  0.909 -0.343  0.168  0.665  0.619  0.004
## 106 -0.193 -0.080  0.516 -0.808  0.571 -0.493  0.121  0.788  0.596 -0.465
## 107 -0.178 -0.766 -0.274 -0.341 -0.254 -0.649  0.366  0.036  1.291  0.497
## 109 -0.442 -0.002  0.480 -0.405  0.265 -0.490  0.018  0.193  0.538  0.512
## 111 -0.306 -0.675 -0.535 -0.226 -0.253 -0.667  0.094  0.019  0.693 -0.229
## 112 -0.015 -0.110  0.119 -0.108 -0.153 -0.422  0.295  0.125  0.326  0.190
## 113 -0.131  0.025  0.504  0.023 -0.121 -0.193  0.237  0.246  0.550  0.417
## 114 -0.195  0.179 -0.188 -0.132 -0.449 -0.550  0.246 -0.260  0.302 -0.051
## 115 -0.078  0.077 -0.024  0.177  0.680  0.293  0.272 -0.354 -0.081 -0.159
## 118 -0.244 -0.064  0.161 -0.291 -0.249  0.004  0.356  0.515  0.260  0.319
## 119 -0.270 -0.008  0.300 -0.325 -0.147 -0.085  0.504  0.265  0.131  0.231
## 120 -0.243  0.049  0.262 -0.193 -0.029 -0.239  0.073  0.249  0.379  0.292
```

```
## 122 -0.007  0.278  0.508 -0.435 -0.471 -0.374  0.362  0.360  0.646  0.970
## 123 -0.272 -0.294 -0.003 -0.251 -0.383 -0.706  0.304 -0.602  0.036 -0.504
## 125 -0.193 -0.047  0.158 -0.395 -0.394 -0.415  0.020  0.082  0.166  0.401
## 126 -0.311 -0.052  0.496 -0.679 -0.314 -0.556  0.654  0.569  0.987  0.911
## 127 -0.320  0.133 -0.075 -0.686 -0.105  0.018  0.556  0.345  0.369  0.411
## 129 -0.066  0.304 -0.167 -0.088 -0.332 -0.495 -0.012  0.166 -0.080  0.380
## 132  0.002 -0.114  0.288 -0.086  0.195  0.044 -0.039 -0.403 -0.018 -0.353
## 133 -0.038  0.234  0.689  0.193  0.490 -0.200  0.065  0.908  0.951  0.473
## 136 -0.775 -1.303  0.062 -0.402 -0.221 -0.819  0.041  0.316  0.438  0.548
## 137 -0.142 -0.222  0.262 -0.295 -0.163 -0.142  0.468  0.364  0.129  0.093
## 138 -0.414 -0.013  0.263 -0.252  0.183 -0.391 -0.117  0.076  0.516  0.298
## 141 -0.561  0.024  0.161  0.150 -0.128 -0.035 -0.022 -0.410  0.318  0.121
## 142  0.045 -0.116  0.290  0.230  1.035  0.709  0.159 -0.068 -0.902  0.010
## 143  0.128 -0.207  0.799  0.293  0.230  0.155  0.159  0.292  0.208  0.421
## 144  0.684  0.119  0.196  0.363  0.588 -0.510 -0.388  0.387  0.316  0.007
## 145 -0.293  0.163  0.434 -0.252  0.061 -0.072  0.269  0.205  0.177  0.511
## 146 -0.092  0.334  0.445  0.008 -0.409  0.288 -0.357  0.192  0.714  0.518
## 147 -0.053  0.074  0.791  0.135 -0.278  0.038  0.286  0.004  0.508  0.375
## 151 -0.079  0.931  0.918  0.969  1.058 -0.041 -0.552 -0.101 -1.070 -0.313
## 152  0.080 -0.100 -0.172 -0.137 -0.225  0.221  0.575  0.138  0.138 -0.020
## 153  0.198 -0.476  0.117 -0.176 -0.584 -0.271  0.352 -0.006 -0.005  0.485
## 156  0.005 -0.344  0.153  0.022  0.016 -0.296 -0.086  0.212  0.117  0.207
## 157 -0.385  0.420  0.094 -0.265 -0.121 -0.435  0.700  0.658  0.096  0.187
## 158 -0.454  0.190  0.128 -0.281 -0.280 -0.111  0.282  0.075  0.241  0.361
## 159 -0.324  0.026  0.319 -0.050  0.083 -0.141  0.288  0.181  0.355  0.136
## 161  0.133  0.477  0.419  0.488  1.485 -0.295  0.424 -0.233 -0.774 -0.760
## 162 -0.870 -0.906 -0.063 -0.439 -0.090 -0.357 -0.272  0.167  0.169  0.282
## 163 -0.325 -0.071  0.255 -0.367 -0.177 -0.391  0.202  0.306  0.092  0.582
## 164 -0.152 -0.731 -0.255 -0.336 -0.281 -0.556  0.274  0.149  0.765  0.389
## 165 -0.021  0.382 -0.220 -0.097  0.806 -0.806  0.536 -0.828  0.156 -0.639
## 168 -0.206  0.546 -0.143  0.249  0.379  0.353 -0.046  0.093  0.032  0.279
## 169  0.268 -1.278 -0.809 -0.982 -0.731 -0.149 -0.148 -0.343  0.429 -0.236
## 171 -0.132 -0.043  0.003 -0.038  0.254 -0.425  0.337 -0.585  0.028 -0.454
## 173 -0.428 -0.559 -0.234 -0.241 -0.316 -0.405  0.139 -0.220  0.873  0.047
## 174 -0.036  0.380  0.713 -0.432 -0.235 -0.063  0.552  0.506  0.809  0.943
## 176 -0.435 -0.372  0.181 -0.471 -0.274 -0.205  0.236  0.355  0.226  0.258
## 182 -0.245  0.298  0.571 -0.027  0.128  0.264  0.493  0.249  0.070  0.651
## 183 -0.153  0.106  0.350 -0.245 -0.132 -0.504  0.171  0.059  0.317  0.237
## 185 -0.741 -0.825 -0.164 -0.434 -0.091 -0.367 -0.160  0.101  0.276  0.186
## 186 -0.334 -0.103  0.413 -0.245 -0.183 -0.117  0.038  0.091  0.327  0.419
## 188 -0.225 -0.058  0.104 -0.408 -0.417 -0.344 -0.055  0.096  0.194  0.329
## 189 -0.301 -0.117  0.072 -0.451 -0.397 -0.239 -0.130  0.066  0.276  0.211
## 191 -0.429 -0.077  0.120 -0.348 -0.364 -0.050  0.128  0.073  0.299  0.280
## 192  0.030  0.791  1.145  0.935  1.574 -0.110 -0.466 -0.075 -1.091 -0.569
## 193 -0.069 -0.061 -0.056  0.089  0.622  0.367  0.172 -0.362 -0.063 -0.194
## 194 -0.182 -0.928 -0.410 -0.180 -0.182 -0.845  0.191  0.170  0.921 -0.174
## 195 -0.235 -0.164  0.484 -0.364  0.231 -0.549  0.223  0.029  0.059  0.222
## 197 -0.286  0.024  0.335 -0.122 -0.040  0.015  0.352  0.118 -0.090  0.410
## 198 -0.469  0.043  0.361 -0.453  0.095 -0.501  0.109  0.306  0.617  0.536
## 200 -0.193  0.118  0.541 -0.027 -0.260 -0.295  0.387 -0.040  0.447  0.418
## 202  0.202  0.012  0.451  0.108  0.085 -0.161  0.053  0.221  0.271  0.238
## 203 -0.343 -0.155  0.078 -0.376 -0.387 -0.266 -0.065  0.099  0.249  0.248
## 204 -0.225 -0.340 -0.122 -0.332 -0.350 -0.731  0.598 -0.392  0.426 -0.197
## 208 -0.158  0.093  0.374 -0.109 -0.036  0.070  0.215  0.156  0.330  0.626
```

```
## 210 -0.151 -0.801 -0.329 -0.460 -0.332 -0.562  0.391  0.037  0.445  0.372
## 211  0.254 -0.055  0.203 -0.062  0.604  0.729 -0.323  0.070 -0.781 -0.022
## 212 -0.415 -0.252 -0.013  0.081 -0.389 -0.124  0.397  0.035 -0.306  0.412
## 213 -0.307 -0.130  0.189 -0.362 -0.240 -0.387  0.129  0.137 -0.062  0.718
## 214 -0.345  0.250 -0.124 -0.048  0.031 -0.334  0.502  0.116  0.128  0.571
## 216  0.016 -0.321  0.558  0.378  0.239  0.041 -0.047  0.114  0.103  0.147
## 217 -0.365 -0.029  0.313 -0.295 -0.300 -0.409  0.168  0.095  0.202  0.346
## 218 -0.438 -0.008  0.468 -0.387  0.199 -0.551 -0.029  0.112  0.416  0.368
## 219 -0.042 -0.117  0.363  0.127 -0.022 -0.119 -0.140 -0.043  0.117  0.194
## 220 -0.351 -0.505 -0.479 -0.256 -0.409 -0.573  0.003 -0.077  0.606 -0.204
## 221 -0.637 -1.096 -0.014 -0.589 -0.266 -0.959  0.119  0.403  0.537  0.497
## 222 -0.093 -0.199  0.269 -0.181  0.088 -0.314  0.269  0.001  0.226  0.332
## 224 -0.249 -0.139  0.383 -0.405 -0.127 -0.314  0.510  0.087  0.249  0.138
## 225 -0.052 -0.397  0.601 -0.485 -0.262 -0.436  0.433 -0.016  0.189 -0.024
##      F1981  F1982  F1983  F1984  F1985  F1986  F1987  F1988  F1989  F1990
## 1    0.483 -0.346  0.164  0.145  0.283 -0.141  0.391  0.919 -0.205  0.730
## 2   -0.351  0.173 -0.128 -0.270 -0.103  0.569 -0.106  0.370 -0.066  0.795
## 3    0.215  0.399  0.560 -0.004  0.508  0.296  0.975  1.304  0.386  1.266
## 5    0.178  1.044  0.859 -0.157  0.059  0.387  0.397  0.883  1.162  1.736
## 6   -0.071  0.164  0.487  0.631  0.694  0.176  0.689  0.572 -0.055  0.687
## 7    0.532  0.097  0.524  0.105  0.006  0.013  0.569  0.457 -0.002  0.432
## 9    0.378  0.359  0.046 -0.100  0.308  0.460  0.446 -0.192  0.611  0.436
## 12   0.495  0.186  0.633 -0.157  0.349  0.388  0.363  0.960  0.153  0.549
## 13   0.277  0.384  1.062 -0.249 -0.568  0.319 -0.263  0.820  1.104  1.262
## 15  -0.030  0.531  0.155  0.020  0.242  0.230  0.466  0.426  0.672  0.764
## 16   0.408 -0.086 -0.834  0.039  0.367  0.668  0.548  0.633  0.047  0.455
## 17  -0.170 -0.041 -0.132 -0.322  0.050  0.026  0.341  0.341  0.064 -0.149
## 21  -0.068  0.526  0.685  0.254  0.455  0.135  0.350  0.460  0.173  0.339
## 22   0.161  0.211  0.548  0.542  0.411  0.307  0.977  0.631 -0.052  0.580
## 23   0.212 -0.111 -0.286 -0.055  0.113 -0.068  0.256  0.567  0.220 -0.087
## 24   0.167  0.324  0.537  0.289  0.330  0.437  0.692  0.334  0.129  0.183
## 26  -0.441  0.310  1.012  0.442  0.293  0.278  1.270  0.287 -0.306  0.738
## 27   0.191  0.277  0.471  0.294  0.092  0.285  0.722  0.461  0.130  0.435
## 28   0.512  0.099  0.533  0.211  0.088  0.040  0.514  0.512  0.054  0.446
## 29   0.122  0.186  0.563  0.021  0.181  0.156  0.498  0.471  0.057  0.381
## 30  -0.043 -0.130  0.389 -0.022 -0.605  0.360 -0.484  0.128  0.405  0.797
## 31   0.282  0.180  0.724  0.799  0.472  0.356  1.011  0.593  0.009  0.603
## 34   0.389  0.150  0.537  0.194  0.348  0.128  0.694  0.415  0.324  0.674
## 35   0.045  0.061  0.164  0.196  0.025  0.084  0.487  0.290 -0.384  0.651
## 36   1.562 -0.673  0.488  0.337 -0.311  0.011  1.340  1.204  0.017  0.078
## 38   0.003  0.229  0.425  0.125  0.156  0.478  0.504  0.265 -0.148  0.347
## 39   0.037  0.306 -0.047  0.508  0.172  0.630  0.344  0.133 -0.271  0.416
## 40   0.373  0.397  0.574 -0.122  0.328  0.080  0.616  0.080  0.327  0.214
## 41   0.370  0.057 -0.193 -0.528 -0.294  0.012  0.831 -0.139  0.257  0.271
## 42   0.370  0.057 -0.193 -0.528 -0.294  0.012  0.831 -0.139  0.257  0.271
## 43   0.219  0.379  0.122 -0.148 -0.127 -0.043  0.430  0.398  0.428  0.852
## 44   0.129  0.192  0.636 -0.233 -0.015  0.017  0.573  0.312 -0.091  0.310
## 46   0.150  0.143  0.506  0.282  0.159  0.307  0.600  0.488 -0.144  0.082
## 48   0.036 -0.061  0.060 -0.043  0.050  0.264 -0.021  0.340  0.130  0.190
## 51  -0.016  0.591  0.303  0.287  0.235  0.357  0.736  0.603  0.680  0.836
## 52   0.088 -0.337 -0.805  0.013 -0.068  0.249 -0.260  0.044  0.085  0.069
## 54   0.300  0.002  1.060  0.379 -1.004 -0.444 -0.985  0.925  1.803  1.843
## 56   0.438  0.080  0.457 -0.039 -0.062  0.015  0.596  0.394 -0.056  0.436
## 57   0.499  0.419  0.631  0.265  0.099  0.255  0.737  0.603  0.251  0.554
```

```
## 58   0.028  0.595  1.176  0.024 -0.070  0.194  1.074  0.425 -0.003  0.503
## 59  -0.259 -0.413 -1.123 -0.228  0.243  0.118 -0.317  0.211 -0.216 -0.082
## 60   0.046  0.372  0.716  0.062  0.158  0.222  0.627  0.596  0.237  0.492
## 64  -0.429  0.170  0.915 -0.040  0.571  0.321  0.567  0.608  0.142  0.281
## 67  -0.364  0.223 -0.266  0.489 -0.118 -0.119  0.221  0.303  0.530  0.801
## 68   0.161  0.151  0.111  0.358  0.317 -0.103  0.206  0.846  0.247  0.348
## 69  -0.240 -0.155  0.964  0.757 -1.177 -0.181 -1.652  0.579  2.179  1.249
## 70   0.097  0.812  0.721 -0.082 -0.338 -0.003  0.001  0.773  1.278  1.591
## 71   0.132  0.323  0.189  0.412  0.154  0.278  0.478  0.356  0.159  0.397
## 72  -0.176 -0.374  0.174  0.204 -0.219 -0.126  0.272  0.232 -0.023  0.124
## 73   0.622  0.326  1.131  0.636  0.384  0.665  1.068  0.829  0.609  1.139
## 75   0.296  0.439  1.071 -0.110 -0.800 -0.007 -0.561  0.893  1.491  1.571
## 76   0.181  0.177  0.691  0.665  0.357  0.294  0.985  0.645  0.237  0.526
## 77   0.358  0.481  0.382 -0.150  0.592  0.227  0.497  0.782  0.908  1.202
## 78  -0.191 -0.243 -0.493 -0.123 -0.063  0.312 -0.395  0.129 -0.204  0.368
## 79  -0.360 -0.642 -2.062 -1.455  0.891  0.381 -0.121  0.513 -1.537 -0.348
## 80   0.331  0.085  0.360 -0.048 -0.429 -0.192  0.442  0.446 -0.169  0.203
## 81   0.500  0.099  0.494  0.038 -0.026  0.010  0.589  0.426 -0.032  0.432
## 82  -0.016  0.457  0.649  0.116  0.164  0.125  0.310  0.481  0.132  0.309
## 83   0.337  0.215  0.635  0.380  0.382  0.077  0.810  0.610  0.116  0.653
## 84   0.473  0.282  0.902  0.516  0.361  0.495  0.828  0.669  0.441  0.960
## 85   0.185  0.410  0.539 -0.351 -0.329  0.015  0.495  0.400 -0.044  0.527
## 86   0.444  0.571  0.622  0.305  0.163  0.282  0.842  0.721  0.396  0.694
## 87  -0.446  0.594  0.274 -0.571  0.286  0.550  0.195  0.755  0.148  1.125
## 88   0.108  0.449  0.581  0.073  0.140  0.138  0.391  0.621  0.191  0.258
## 89   0.146  0.105  0.997 -0.129 -1.068  0.356 -0.547  0.385  0.864  1.070
## 90  -0.909 -0.258 -0.863  0.204  0.164 -0.077  0.685 -0.088 -0.174  0.169
## 91   0.072 -0.017 -0.135 -0.107  0.211  0.190  0.578  0.504 -0.018 -0.081
## 92   0.200  0.036  0.405 -0.110  0.151  0.138  0.514  0.437  0.130  0.089
## 93   0.677 -0.120 -0.111  0.151  0.243  0.207  0.536  0.706  0.220  0.727
## 94   0.257 -0.406 -0.802  0.036  0.021  0.370  0.368  0.106  0.176  0.356
## 95   0.377  0.154  0.408  0.336 -0.439 -0.726 -0.143  0.246  1.054  0.829
## 96   0.292  0.076  0.381  0.356 -0.489 -0.684 -0.222  0.270  1.105  0.913
## 97  -0.213 -0.564 -1.066 -0.209  0.010  0.056 -0.283  0.037 -0.174 -0.112
## 98  -0.279  0.511  0.384 -0.468  0.117  0.436  0.192  0.842  0.417  1.132
## 100 -0.631 -0.041  0.107 -0.605  0.130 -0.686  0.326 -0.154  0.556  1.132
## 101 -0.158 -0.682 -1.071 -0.227 -0.009  0.069 -0.122  0.030 -0.065 -0.030
## 103  0.183  0.297  0.609  0.173 -0.057  0.133  0.730  0.589 -0.208 -0.050
## 105 -0.597  0.911  0.598 -0.145  0.152 -0.702  0.231  0.562  1.235  1.329
## 106 -0.767  0.420  0.456 -0.282  0.262 -0.765  0.374  0.255  0.780  1.229
## 107  0.418 -0.142 -0.622  0.256  0.003  0.467  0.723  0.449  0.141  0.396
## 109  0.486  0.217  0.321  0.129  0.321  0.079  0.982  0.361  0.299  0.487
## 111  0.017 -0.496 -0.958 -0.081 -0.015  0.233 -0.229  0.019  0.129  0.059
## 112 -0.262  0.300  1.007  0.351  0.812  0.513  0.606  0.484  0.017  0.358
## 113  0.171  0.249  0.536  0.388  0.282  0.173  0.951  0.824  0.364  0.581
## 114  0.022  0.136 -0.332 -0.076  0.099  0.236  0.060  1.051 -0.006  0.557
## 115  0.045  0.544  0.942 -0.371 -0.336  0.383 -0.045  0.929  1.089  1.308
## 118  0.117  0.293  0.430 -0.100  0.088 -0.041  0.534  0.572  0.061  0.108
## 119 -0.191  0.000  1.038  0.363  0.016  0.162  0.679  0.693  0.174  0.616
## 120  0.256  0.270  0.689  0.052  0.244  0.281  0.590  0.525  0.181  0.548
## 122  0.395  0.264  0.830  0.609  0.512  0.304  1.081  0.784  0.107  0.903
## 123 -0.344  0.623  0.037 -0.267  0.426  0.400  0.525  1.194  0.206  1.235
## 125  0.406  0.074  0.433 -0.029 -0.060  0.017  0.591  0.404 -0.001  0.424
## 126  0.910  0.593  1.623  0.571  0.592  0.293  1.562  0.875  0.737  1.481
```

```
## 127  0.199  0.316  0.286 -0.210 -0.060  0.181  0.656  0.443  0.063  0.220
## 129  0.162  0.573  0.024 -0.102  0.097  0.298 -0.119  0.174  0.493  0.274
## 132 -0.083  0.550  0.494 -0.603 -0.106  0.433  0.196  0.758  0.908  1.284
## 133  0.217  1.135  0.601 -0.353 -0.444  0.361  0.166  0.630  1.334  1.530
## 136  0.414  0.431  0.724  0.208  0.797  0.190  0.993  0.837  0.665  1.409
## 137 -0.188 -0.040  0.918  0.263 -0.008  0.103  0.679  0.588  0.092  0.368
## 138  0.299  0.080  0.156  0.086  0.190  0.091  0.569  0.408  0.338  0.215
## 141 -0.087 -0.164 -0.423 -0.079  0.324 -0.063  0.349  0.595  0.079 -0.035
## 142  0.339  0.470  0.870  0.062 -0.851 -0.197 -0.503  0.796  1.541  1.567
## 143  0.377  0.194  0.692  0.328  0.509  0.366  0.069  1.050  0.479  0.764
## 144  0.427 -0.062 -0.294  0.174  0.398  0.382  0.397  0.488  0.736  0.572
## 145  0.255  0.659  0.786  0.040  0.107  0.171  0.422  0.505  0.158  0.350
## 146  0.040  0.371  0.029  0.607  0.284  0.733  0.655  0.587 -0.384  0.480
## 147  0.155  0.360  0.238  0.794  0.389  0.544  0.823  0.501 -0.412  0.582
## 151 -0.494 -0.054  0.633  0.532 -0.594 -0.430 -0.830  0.476  1.741  1.517
## 152  0.223 -0.418 -0.698 -0.706 -0.104 -0.042  0.070  0.201 -0.347  0.061
## 153  0.310 -0.370 -0.399 -0.206  0.221 -0.288  0.161  0.720 -0.313  0.339
## 156  0.293 -0.091  0.367  0.307  0.222  0.341  0.380  0.666  0.424  0.413
## 157  0.387  0.356 -0.312  0.482  0.370  0.835  0.173 -0.073 -0.109  0.016
## 158  0.059  0.183  1.303  0.228  0.115  0.154  0.884  0.511  0.056  0.359
## 159  0.228  0.154  0.602  0.148  0.345  0.266  0.563  0.799  0.281  0.412
## 161  0.436  0.324  1.452  0.238 -1.046  0.015 -1.081  0.681  1.695  1.709
## 162  0.546  0.560  0.286 -0.120  0.528  0.094  0.752  0.637  1.117  1.401
## 163  0.568  0.155  0.543  0.146 -0.049  0.105  0.597  0.528  0.081  0.522
## 164  0.417 -0.130 -0.826  0.039  0.357  0.510  0.385  0.494 -0.069  0.406
## 165  0.043 -0.058  0.837 -0.129 -1.193  0.431 -0.724  0.092  0.752  1.100
## 168  0.105  0.107  0.454  0.678  0.398  0.789  0.327  0.527  0.200  0.752
## 169  0.971 -0.502  0.743  0.119 -1.048 -0.735 -0.073  0.197 -0.408 -0.739
## 171 -0.328  0.407  0.426 -0.580  0.178  0.338  0.103  0.771  0.278  1.001
## 173  0.077 -0.397 -0.847 -0.309 -0.019  0.190  0.532  0.452 -0.112  0.095
## 174  0.767  0.339  1.250  0.661  0.526  0.483  1.022  0.874  0.575  1.193
## 176  0.170  0.433  0.503 -0.294 -0.114  0.250  0.505  0.418 -0.112  0.239
## 182  0.121  0.336  0.454 -0.001  0.007  0.097  0.869  0.719 -0.101  0.108
## 183 -0.328  0.212  0.707  0.535  0.663  0.463  0.743  0.338 -0.034  0.324
## 185  0.344  0.709  0.550 -0.163  0.484  0.259  0.724  0.796  1.039  1.446
## 186  0.151  0.137  0.637 -0.020  0.077  0.158  0.685  0.704  0.219  0.569
## 188  0.354  0.089  0.379 -0.039 -0.228 -0.076  0.525  0.424 -0.025  0.318
## 189  0.331  0.087  0.364 -0.047 -0.426 -0.185  0.444  0.453 -0.164  0.204
## 191  0.219  0.228  0.453 -0.252  0.001  0.126  0.734  0.561  0.069  0.310
## 192 -0.228 -0.134  0.911  0.583 -1.036 -0.493 -1.201  0.726  1.998  1.692
## 193 -0.016  0.579  0.869 -0.330 -0.328  0.242 -0.010  0.916  1.142  1.417
## 194  0.146 -0.536 -0.851  0.004 -0.028  0.402 -0.174 -0.203  0.366  0.181
## 195  0.118 -0.139  0.259 -0.553 -0.059 -0.233  0.352  0.299  0.062  0.349
## 197  0.387  0.437  0.724  0.125  0.094  0.174  0.598  0.657 -0.083  0.190
## 198  0.346  0.182  0.495  0.158  0.359  0.137  0.815  0.354  0.384  0.592
## 200  0.164  0.173  0.677  0.550  0.369  0.212  0.964  0.608  0.080  0.597
## 202  0.186  0.238  0.142  0.376  0.290  0.082  0.049  0.857  0.487  0.419
## 203  0.325  0.082  0.292 -0.101 -0.534 -0.336  0.422  0.303 -0.263  0.167
## 204  0.094  0.821  0.226 -0.112  0.407  0.447  0.610  1.336  0.481  1.418
## 208  0.448  0.385  0.664  0.279  0.098  0.237  0.605  0.433 -0.103  0.264
## 210  0.225 -0.325 -0.697 -0.187  0.138  0.191  0.162  0.191 -0.310  0.241
## 211  0.176  0.118  0.348  0.337 -0.522 -0.594 -0.283  0.307  1.145  1.016
## 212  0.871 -0.343  0.540 -0.233 -0.025  0.584  0.913  0.471  0.324  0.674
## 213  0.514  0.052  0.552  0.189  0.041  0.057  0.506  0.523  0.073  0.461
```

```
## 214  0.500  0.574 -0.052  0.103  0.431  0.770  0.336 -0.504  0.740  0.575
## 216  0.099  0.072  0.215  0.034  0.603 -0.068 -0.166  0.689  0.122  0.357
## 217  0.134  0.116  0.469 -0.107 -0.295 -0.163  0.415  0.161 -0.098  0.356
## 218  0.490  0.196  0.082 -0.126 -0.028  0.088  1.048  0.181  0.034  0.402
## 219  0.153  0.131  0.109  0.077  0.158  0.110  0.264  0.600  0.203  0.315
## 220 -0.215 -0.562 -1.068 -0.201  0.017  0.055 -0.294  0.033 -0.173 -0.113
## 221  0.621  0.418  0.837  0.432  0.759  0.294  1.109  0.384  0.691  1.367
## 222  0.443  0.086  0.460  0.127 -0.031  0.242  0.403  0.558  0.331  0.639
## 224 -0.158  0.340  1.064  0.575  0.206  0.061  0.958  0.627  0.139  0.772
## 225 -0.360  0.170  1.223  0.483  0.027  0.025  1.070  0.447  0.181  0.567
##      F1991  F1992  F1993  F1994  F1995  F1996  F1997  F1998  F1999  F2000
## 1   -0.168 -0.294  0.220  0.430  0.359 -0.116  0.471  0.675  1.198  0.993
## 2   -0.269  0.106  0.076  1.330 -0.172 -0.038  0.075  0.795  0.670  1.065
## 3    0.031 -0.312  0.552  0.732  0.595  0.846  1.059  1.109  1.476  0.820
## 5    0.231  0.386  0.174  1.508  1.279  0.570  1.788  1.018  1.055  1.050
## 6    0.341  0.466  0.256  0.212  0.753  0.370  0.107  1.064  0.417  0.169
## 7    0.441  0.365  0.535  0.575  0.651  0.350  0.459  1.060  0.532  0.264
## 9    0.261 -0.261  0.086  0.487  0.259  0.512  0.759  0.351  0.160 -0.186
## 12   0.820  0.281  0.484  0.221  0.413  0.604  0.383  1.092  0.580  0.148
## 13   0.125  1.248  0.527  1.958  0.939 -0.203  0.514  1.343  0.986  1.769
## 15   0.788  0.286  0.378  0.801  0.671  0.008  0.787  0.924  0.619  0.163
## 16  -0.243 -0.544  0.127  0.998  0.251  0.695  0.376  1.435  2.055  1.119
## 17  -0.024 -0.146 -0.446  0.175  0.173  0.137 -0.173  0.504  0.780  0.226
## 21   0.542  0.311  0.447  0.756  0.759  0.210  0.866  0.904  0.422  0.175
## 22   0.302 -0.027  0.531  0.439  0.406  0.736  0.557  1.042  0.621  0.449
## 23   0.081 -0.229 -0.248  0.315  0.518  0.307 -0.300  0.825  1.022  0.214
## 24   0.603  0.031  0.404  0.883  0.770  0.290  0.825  0.926  0.337  0.403
## 26   0.062  0.813  0.512 -0.123  1.141 -0.319 -0.096  0.857  0.552 -0.718
## 27   0.468  0.403  0.495  0.608  0.799  0.504  0.671  1.234  0.523  0.495
## 28   0.439  0.333  0.541  0.666  0.613  0.337  0.459  1.091  0.525  0.192
## 29   0.384  0.326  0.228  0.453  0.471  0.429  0.671  1.296  0.575  0.485
## 30  -0.161  0.149 -0.322  1.583  0.221 -0.360 -0.336  0.775  0.696  1.184
## 31   0.527  0.004  0.725  0.311  0.401  0.917  0.621  1.006  0.548  0.537
## 34   0.597  0.556  0.425  0.496  0.738  0.357  0.393  1.414  0.409  0.296
## 35   0.563 -0.205  0.247  0.305  0.280  0.335  0.547  1.082  0.604  0.319
## 36   0.336  0.100  0.342  0.467  0.938 -0.125  0.426  2.470  1.694  1.291
## 38   0.612 -0.457  0.329  0.562  0.187  0.047  0.458  1.195  0.502  0.683
## 39   0.649 -0.279  0.275  0.381  0.175  0.586  0.485  0.841  0.569  0.281
## 40   0.108 -0.116  0.235  0.279 -0.004  0.276  0.716  0.721  0.251 -0.179
## 41   0.726 -0.232  0.300  0.338 -0.028  0.028  0.293  0.940  0.964  0.298
## 42   0.726 -0.232  0.300  0.338 -0.028  0.028  0.293  0.940  0.964  0.298
## 43   0.520  0.130  0.281  0.733  0.577  0.210  0.733  1.264  1.231  0.572
## 44   0.449  0.606  0.263  0.245  0.517  0.143  0.504  0.901 -0.010 -0.009
## 46   0.293 -0.213  0.100  0.293  0.387 -0.077  0.627  0.937  0.455  0.537
## 48   0.197  0.210 -0.069  0.186  0.455  0.247 -0.108 -0.258  0.625  0.303
## 51   0.899  0.608  0.639  1.016  1.222  0.627  1.031  1.191  0.806  0.508
## 52   0.379 -0.928 -0.421  1.047  0.058  0.253  0.008  0.961  1.079  0.618
## 54   0.616  1.452  0.235  0.967  1.304 -0.753  0.651  0.869  1.334  1.719
## 56   0.453  0.433  0.510  0.572  0.695  0.434  0.595  0.999  0.486  0.282
## 57   0.424  0.505  0.474  0.877  0.950  0.664  0.988  1.371  0.900  0.629
## 58   0.536  0.873  0.571  0.363  0.738  0.053  1.240  1.311  0.202  0.244
## 59   0.384 -0.611  0.014  0.611  0.151  0.381  0.009  0.744  0.828  0.054
## 60   0.584  0.583  0.331  0.641  0.556  0.078  0.752  0.847  0.301  0.318
## 64   0.530  1.147  0.733 -0.006  0.585 -0.042  0.235  0.991  0.505 -0.061
```

```
## 67   1.113  0.812 -0.053 -0.172 -0.310  0.202  0.755  0.553  0.469  0.188
## 68   0.090  0.039 -0.319 -0.133  0.385  0.445  0.152  0.765  0.538  0.706
## 69   1.138  1.165  0.937  0.146  1.701  0.137  0.783  0.071  1.159  2.024
## 70   0.257  0.659  0.325  1.547  1.326  0.188  1.240  0.947  1.199  1.175
## 71   0.341  0.352  0.141  0.543  0.582  0.188  0.335  0.633  0.456  0.329
## 72   0.081 -0.166  0.190  0.187  0.582  0.104  0.292  1.119  0.589  0.307
## 73   0.810  0.852  1.045  0.814  0.878  1.122  1.323  1.555  0.750  0.958
## 75   0.286  1.228  0.310  1.625  1.307 -0.699  0.558  1.153  1.367  1.764
## 76   0.394  0.153  0.473  0.564  0.695  0.657  0.502  1.140  0.564  0.430
## 77   0.111  0.176 -0.128  0.736  1.315  0.747  1.470  1.109  0.715  0.829
## 78  -0.197 -0.528 -0.328  1.060 -0.043 -0.161 -0.195  0.632  0.800  0.679
## 79  -0.291 -1.228 -1.355 -0.425 -0.328  0.667  0.391  1.269  0.522  0.839
## 80   0.398  0.388  0.431  0.456  0.710  0.471  0.630  1.187  0.617  0.462
## 81   0.448  0.401  0.524  0.564  0.671  0.386  0.510  1.035  0.515  0.279
## 82   0.624  0.445  0.346  0.592  0.595  0.090  0.710  0.867  0.558  0.310
## 83   0.679  0.330  0.702  0.471  0.486  0.791  0.785  1.194  0.512  0.651
## 84   0.786  0.710  0.893  0.744  0.798  0.955  1.129  1.560  0.746  0.996
## 85   0.286  0.131  0.178  0.482  0.988  0.610  0.884  1.287  0.405  0.658
## 86   0.775  0.590  0.450  1.198  1.188  0.685  1.099  1.244  1.147  0.858
## 87  -0.017  0.533  0.480  1.474  0.200  0.361  0.857  0.944  0.790  1.177
## 88   0.493  0.481  0.203  0.774  0.876  0.075  0.797  1.018  0.384  0.128
## 89  -0.058  0.911  0.069  1.755  0.631 -0.340 -0.148  1.081  0.603  1.733
## 90   0.766  0.231  0.225 -0.108 -0.330  0.562  0.436  0.238  0.471  0.274
## 91   0.190  0.035  0.223  0.107  0.238  0.339 -0.064  0.614  0.468  0.350
## 92   0.273  0.341  0.289  0.343  0.382  0.428  0.463  1.050  0.282  0.275
## 93   0.389 -0.757 -0.017  0.802  0.698  0.239  0.644  1.165  1.658  1.215
## 94   0.608 -1.169 -0.469  1.009  0.366  0.798  0.305  1.295  1.917  0.995
## 95   0.199  0.446  0.064  0.282  1.198 -0.006  0.977  0.937  1.077  0.577
## 96   0.178  0.462 -0.037  0.269  1.164 -0.112  0.924  0.928  1.112  0.636
## 97   0.393 -1.037 -0.368  0.796 -0.153  0.342 -0.118  0.892  0.894  0.250
## 98   0.029  0.542  0.527  1.513  0.418  0.233  0.931  0.969  0.918  1.243
## 100  0.726  0.333  0.012  0.965  0.348 -0.127  0.454  1.199  0.948  0.636
## 101  0.521 -1.110 -0.503  0.941 -0.047  0.487 -0.176  1.023  1.052  0.375
## 103  0.258  0.406  0.048  0.488  0.356  0.366  0.415  0.250  0.240  0.521
## 105  0.604  0.778  0.577  1.355  0.694  0.276  0.991  1.776  1.382  0.594
## 106  0.280  0.621  0.040  1.249  0.418 -0.019  0.737  1.470  1.032  0.414
## 107  0.535 -0.523 -0.095  0.993  0.217  0.929  0.528  1.346  2.064  1.280
## 109  0.757  0.259  0.338  0.464  0.692  0.198  0.384  1.485  0.721  0.094
## 111  0.411 -1.017 -0.433  1.048  0.044  0.390 -0.103  1.001  1.100  0.544
## 112  0.538  0.988  1.042  0.114  0.732 -0.212  0.243  0.930  1.243  0.326
## 113  0.520  0.246  0.529  0.533  0.653  0.587  0.972  1.297  0.781  0.560
## 114  0.231 -0.404  0.306  0.470  0.344  0.541  0.472  0.760  1.248  0.306
## 115  0.184  1.090  0.635  1.925  0.900 -0.033  0.942  1.208  0.979  1.464
## 118  0.384  0.386  0.380  0.319  0.405  0.198  0.653  0.821  0.440  0.451
## 119  0.150  0.749  0.153  0.270  0.794  0.189  0.626  1.031  0.349  0.797
## 120  0.464  0.429  0.278  0.420  0.544  0.481  0.690  1.279  0.483  0.449
## 122  0.685  0.194  1.026  0.206  0.570  1.161  0.870  1.214  0.375  0.647
## 123  0.147  0.275  0.625  1.421  0.461  0.639  1.054  0.876  1.268  1.055
## 125  0.445  0.405  0.487  0.565  0.670  0.433  0.591  1.003  0.477  0.262
## 126  0.870  0.890  0.990  0.673  1.222  1.555  1.321  1.801  0.539  1.200
## 127  0.492  0.157  0.179  0.466  0.314  0.042  0.585  0.827  0.211  0.173
## 129  0.268  0.086  0.327  0.711  0.810  0.567  0.500  0.736  0.642  0.634
## 132  0.107  0.651  0.461  1.302  0.672  0.211  1.297  0.922  0.924  1.112
## 133  1.080  0.810  0.454  1.329  1.268  0.410  1.933  2.117  1.764  0.980
```

```
## 136  0.133  0.246  0.222  1.019  1.174  0.936  1.271  1.483  0.976  0.845
## 137  0.125  0.759  0.299  0.087  0.555  0.111  0.209  0.949  0.288  0.375
## 138  0.509  0.101  0.126  0.494  0.654  0.439  0.272  1.192  0.926  0.223
## 141  0.075 -0.073 -0.177  0.158  0.305  0.208 -0.413  0.313  0.640  0.082
## 142  0.265  1.184  0.250  1.367  1.542 -0.779  0.611  1.068  1.574  1.595
## 143  0.350  0.467  0.270  0.228  1.010  1.204  0.549  2.002  1.229  0.759
## 144 -0.028 -0.716 -0.380 -0.077  0.108  0.244 -0.128  0.981  1.009  0.265
## 145  0.497  0.487  0.317  0.707  0.898  0.077  0.808  1.087  0.169  0.142
## 146  0.862 -0.286  0.403  0.205  0.373  1.054  0.688  0.652  0.549  0.677
## 147  0.621 -0.122  0.497  0.424  0.380  0.748  0.646  1.034  0.766  0.526
## 151  0.977  1.121  0.697  0.065  0.944 -0.060  0.761  0.383  1.257  1.427
## 152 -0.304 -0.550  0.247  0.126 -0.018 -0.114 -0.227  0.745  0.578  0.554
## 153 -0.306 -0.413  0.415  0.162 -0.116 -0.152 -0.386  0.436  0.823  0.668
## 156  0.281  0.542  0.364  0.356  0.654  0.551  0.079  1.012  0.311  0.377
## 157  0.648 -0.390  0.208  0.865  0.542  0.095  0.869  0.176  0.004  0.101
## 158  0.501  0.816  0.494  0.511  0.798  0.158  0.855  1.290  0.232  0.325
## 159  0.359  0.379  0.385  0.501  0.528  0.427  0.489  1.322  0.561  0.673
## 161  0.407  1.142  0.065  1.371  1.110 -0.787  0.011  0.947  1.203  1.887
## 162  0.440  0.434 -0.199  0.684  1.663  0.756  1.601  1.212  0.634  0.665
## 163  0.411  0.302  0.512  0.710  0.730  0.444  0.654  1.243  0.672  0.273
## 164 -0.151 -0.519  0.031  0.666  0.064  0.496  0.066  1.174  1.735  0.944
## 165  0.033  0.364 -0.428  1.720  0.409 -0.424 -0.422  0.785  0.620  1.338
## 168  0.643  0.245  0.736  0.986  0.658  0.451  0.895  1.220  1.390  1.465
## 169 -0.700 -1.344 -1.061 -0.297 -0.276  0.114 -0.370  0.736  1.663  1.095
## 171 -0.085  0.508  0.546  1.516  0.288  0.199  0.919  1.113  0.846  1.403
## 173  0.376 -0.985 -0.186  0.655  0.193  0.580  0.010  1.035  1.489  0.787
## 174  0.800  0.875  1.097  0.634  0.938  1.219  1.370  1.574  0.581  0.918
## 176  0.439  0.179  0.230  0.507  0.432  0.114  0.598  0.968  0.295  0.406
## 182  0.228  0.531  0.162  0.499  0.461  0.619  0.423  0.617  0.388  0.421
## 183  0.367  0.807  0.836  0.208  0.633 -0.150  0.219  0.825  1.096  0.271
## 185  0.209  0.305 -0.059  1.044  1.444  0.722  1.535  1.189  0.814  0.810
## 186  0.516  0.214  0.217  0.305  0.575  0.402  0.559  1.187  0.355  0.462
## 188  0.422  0.382  0.444  0.499  0.650  0.431  0.565  1.085  0.526  0.337
## 189  0.401  0.394  0.426  0.459  0.709  0.469  0.626  1.186  0.614  0.459
## 191  0.337  0.579  0.286  0.305  0.827  0.922  0.775  1.357  0.614  0.657
## 192  1.025  1.374  0.806  0.195  1.263 -0.164  0.981  0.561  1.362  1.721
## 193  0.328  0.969  0.562  1.859  1.001  0.029  1.063  1.111  0.980  1.420
## 194  0.481 -1.120 -0.568  1.274  0.153  0.443 -0.126  1.147  1.282  0.668
## 195  0.575 -0.077  0.363  0.398  0.190  0.015  0.142  1.200  0.727  0.427
## 197  0.332  0.338  0.029  0.428  0.347  0.217  0.586  0.499 -0.232  0.530
## 198  0.729  0.455  0.389  0.438  0.769  0.319  0.480  1.529  0.504  0.140
## 200  0.245  0.046  0.468  0.454  0.493  0.627  0.554  1.088  0.575  0.523
## 202  0.390  0.268  0.001  0.301  0.471  0.282  0.170  0.201  0.119  0.272
## 203  0.319  0.261  0.490  0.354  0.715  0.520  0.681  1.208  0.687  0.512
## 204 -0.041  0.000  0.635  1.328  0.659  0.633  1.252  0.987  1.747  1.014
## 208  0.207  0.248  0.176  0.269  0.431  0.299  0.542  0.411  0.072  0.273
## 210 -0.282 -0.667 -0.038  0.381 -0.198  0.306 -0.342  0.968  1.293  0.681
## 211  0.210  0.522 -0.015  0.413  1.119 -0.142  0.882  0.860  1.133  0.724
## 212  0.527  0.395  0.004  0.466  0.630 -0.011  0.384  1.272  0.758  1.000
## 213  0.422  0.286  0.535  0.666  0.642  0.342  0.493  1.101  0.548  0.202
## 214  0.309  0.146  0.280  0.450  0.277  0.478  1.099  0.102  0.065  0.333
## 216  0.066  0.055 -0.281 -0.074  0.439  0.474  0.245  0.757  0.883  0.777
## 217  0.460  0.454  0.525  0.320  0.770  0.545  0.609  1.039  0.339  0.298
## 218  0.616  0.101  0.332  0.329  0.377  0.001  0.310  1.307  0.740  0.129
```

```
## 219  0.075 -0.061 -0.307 -0.148  0.400  0.336  0.097  0.369  0.238  0.425
## 220  0.396 -1.045 -0.368  0.800 -0.166  0.338 -0.121  0.894  0.900  0.249
## 221  0.550  0.529  0.315  0.903  1.356  1.353  1.536  1.415  0.935  0.874
## 222  0.468  0.184  0.348  0.507  0.835  0.355  0.656  0.993  0.783  0.728
## 224  0.166  0.544 -0.117  0.362  0.761  0.393  0.339  0.876  0.064 -0.040
## 225  0.192  1.010  0.300 -0.085  0.685 -0.247 -0.025  0.801  0.030 -0.417
##      F2001 F2002 F2003  F2004 F2005  F2006  F2007 F2008  F2009  F2010  F2011
## 1    1.311 1.365 0.587  1.373 0.401  1.720  0.675 0.704  0.895  1.613  1.397
## 2    1.532 0.492 0.970  0.444 0.189  0.345  1.316 0.978  0.910  1.191  1.055
## 3    1.856 1.258 1.585  0.988 1.264  1.395  1.220 1.185  0.945  2.265  1.398
## 5    1.480 0.835 1.949  0.936 0.851  1.485  1.024 0.946  1.413  0.471  1.677
## 6    0.295 0.735 0.889  0.414 1.021  0.561  0.885 0.501  0.708  1.194  0.880
## 7    0.587 0.706 0.816  0.521 0.828  0.691  0.957 0.411  0.566  1.090  0.489
## 9    0.425 0.278 0.635  0.470 0.281  0.596 -0.169 0.601  0.857  0.135  0.386
## 12   0.336 0.736 0.835  0.723 1.211  0.721  0.929 0.625  1.030  0.673  0.208
## 13   1.501 1.531 1.464  0.829 0.628  0.907  2.137 1.582  1.544  0.656  1.373
## 15   0.135 0.856 0.989  0.311 0.455  0.385  0.937 0.842  0.410  0.314  0.363
## 16   1.216 1.552 1.256  1.385 1.065  1.823  1.080 1.329  1.224  2.286  1.431
## 17   0.316 0.398 0.239  0.269 0.592  0.814  0.266 0.093  0.844  0.768  0.144
## 21   0.445 0.733 0.948  0.701 0.849  0.655  0.850 0.579  0.922  0.843  0.724
## 22   0.517 0.721 0.936  0.706 1.105  1.035  0.806 0.632  0.950  1.230  0.949
## 23   0.720 0.492 0.498  0.476 0.745  0.955  0.978 0.555  1.394  1.202  0.534
## 24   0.653 1.016 0.641  0.846 0.764  0.935  0.537 0.396  0.658  0.680  1.165
## 26  -0.186 0.359 0.740 -0.133 1.039 -0.505  0.230 0.153 -0.319  0.936 -0.048
## 27   0.746 1.052 0.927  0.768 1.085  0.770  0.969 0.731  0.969  1.112  0.814
## 28   0.570 0.741 0.843  0.548 0.825  0.760  1.007 0.406  0.621  1.053  0.393
## 29   0.602 0.669 0.735  0.673 0.893  0.718  0.743 0.511  0.875  1.012  0.725
## 30   1.648 0.854 0.181  0.533 0.215  0.571  1.883 1.177  1.291  1.361  0.422
## 31   0.502 1.015 0.986  0.867 1.449  1.162  0.867 0.297  0.942  1.250  1.001
## 34   0.571 0.836 0.711  0.594 0.781  0.767  0.604 0.430  0.453  1.225  0.424
## 35   0.198 0.770 0.707  0.779 1.004  0.983  0.626 0.653  1.047  1.181  0.655
## 36   1.421 0.540 1.240  0.485 1.282  2.343  1.333 0.851  0.539  2.915  1.438
## 38   0.400 0.745 0.845  0.957 0.983  0.967  0.537 0.682  1.119  1.162  0.763
## 39   0.291 0.797 0.838  0.831 1.148  1.368  0.605 0.466  1.236  1.181  0.969
## 40   0.054 0.140 0.312  0.563 0.275  0.575 -0.219 0.502  0.520 -0.015  0.206
## 41   0.854 0.961 0.990  0.701 0.733  0.897  1.008 0.415  0.910  0.367  0.333
## 42   0.854 0.961 0.990  0.701 0.733  0.897  1.008 0.415  0.910  0.367  0.333
## 43   1.038 1.131 0.822  1.112 1.048  1.232  1.538 1.090  1.336  0.968  0.792
## 44   0.438 0.675 0.693  0.585 0.681  0.531  0.641 0.385  0.856  1.037  0.467
## 46   0.393 0.872 0.961  0.913 1.014  0.844  0.768 0.664  0.928  1.347  0.844
## 48   0.402 0.292 0.262  0.257 0.115  0.314  0.344 0.208  0.077  0.604  0.548
## 51   0.535 0.945 1.089  0.872 0.787  0.914  0.902 0.642  0.930  0.957  0.538
## 52   1.161 0.836 0.585  0.614 0.335  0.622  0.814 1.031  0.983  2.030  0.715
## 54   1.044 1.652 0.707  1.032 1.282  1.349  2.136 1.853  1.320 -0.199  0.677
## 56   0.518 0.684 0.782  0.491 0.819  0.718  0.871 0.401  0.539  1.193  0.591
## 57   0.909 0.960 1.235  0.806 0.967  1.003  1.260 0.667  0.710  1.222  0.543
## 58   0.478 0.777 0.830  0.835 0.837  0.808  0.818 0.702  0.961  1.087  0.783
## 59   0.656 0.827 0.730  0.647 0.511  0.726  0.602 0.937  0.921  2.325  0.629
## 60   0.572 0.690 0.878  0.639 0.513  0.495  0.430 0.199  0.788  0.496  0.508
## 64   0.517 0.601 0.715  0.525 1.153  0.365  1.133 0.640  0.383  1.287  0.897
## 67   0.461 1.034 1.604  1.019 0.487  1.136  0.952 0.890  1.441  0.260  1.055
## 68   0.728 0.720 0.581  0.526 0.698  0.636  1.032 0.584  0.409  0.978  0.898
## 69   1.365 1.171 0.713  1.233 2.201  1.204  1.946 2.130  1.695  0.242  1.354
## 70   1.391 1.054 1.800  0.969 1.020  1.306  1.407 0.992  1.212  0.395  1.534
```

```
## 71   0.502 0.796 0.703  0.531 0.672  0.841  0.850 0.357  0.800  0.760  0.214
## 72   0.286 0.662 0.893  0.831 0.808  0.737  0.926 0.782  0.824  1.080  0.657
## 73   1.316 1.380 1.103  1.188 1.498  1.221  1.090 1.376  0.688  1.324  1.060
## 75   1.292 1.491 1.258  0.998 1.025  1.254  2.088 1.542  1.282  0.196  1.121
## 76   0.565 0.825 0.988  0.739 0.967  0.991  0.946 0.698  0.884  1.276  0.883
## 77   1.280 0.862 1.400  1.027 0.841  1.425  0.830 0.982  1.283  1.318  1.618
## 78   1.314 0.435 0.385  0.337 0.213  0.254  1.080 0.881  0.771  1.584  0.394
## 79   0.831 1.186 2.328  1.469 1.878  1.717  1.363 0.959  0.851  3.058  1.684
## 80   0.691 0.627 0.905  0.433 1.004  0.739  0.678 0.502  0.507  1.201  0.677
## 81   0.557 0.695 0.816  0.507 0.827  0.698  0.921 0.405  0.547  1.137  0.539
## 82   0.344 0.556 0.990  0.611 0.801  0.612  0.597 0.213  0.692  0.685  0.429
## 83   0.792 1.130 0.979  1.040 1.190  1.117  0.974 1.113  0.931  1.321  1.095
## 84   1.244 1.281 1.040  1.171 1.401  1.186  1.034 1.362  0.811  1.328  1.092
## 85   0.825 1.074 0.948  0.942 1.321  1.003  1.025 0.558  1.162  1.115  0.968
## 86   0.758 0.953 1.240  0.888 1.042  0.935  1.151 0.624  0.806  1.206  0.489
## 87   1.487 0.716 1.501  0.478 0.479  0.609  1.305 0.958  1.042  0.774  1.047
## 88   0.396 0.776 0.672  0.491 0.956  0.621  0.769 0.566  0.811  0.806  0.730
## 89   1.391 1.423 0.710  0.543 0.236  0.699  2.142 1.495  1.613  0.806  0.891
## 90   0.584 0.784 1.784  1.235 0.448  1.032  1.101 0.753  0.907  1.147  0.959
## 91   0.473 0.827 0.665  0.545 0.567  0.638  0.607 0.263  1.134  1.129  0.365
## 92   0.530 0.607 0.594  0.540 0.710  0.422  0.464 0.223  0.563  0.766  0.306
## 93   1.525 1.716 0.943  1.528 0.828  1.847  0.874 1.136  1.177  2.214  1.345
## 94   1.289 1.168 0.960  1.084 0.526  1.621  0.935 1.155  0.881  2.712  0.910
## 95   0.551 0.830 1.024  0.900 1.175  1.159  1.345 0.836  0.804 -0.104  0.559
## 96   0.516 0.891 1.049  0.952 1.165  1.229  1.321 0.829  0.874 -0.111  0.681
## 97   0.855 0.729 0.559  0.556 0.199  0.593  0.521 0.724  0.824  2.321  0.578
## 98   1.533 0.913 1.526  0.746 0.563  0.840  1.552 1.133  1.234  0.755  1.253
## 100  0.418 0.630 0.326  1.116 0.737  0.390  1.004 0.671  0.801  0.922  0.596
## 101  0.983 0.666 0.498  0.620 0.103  0.752  0.516 0.732  0.549  2.625  0.506
## 103  0.602 0.734 0.879  0.648 0.762  0.890  0.634 0.824  1.293  1.106  1.137
## 105  0.859 0.844 0.926  1.576 0.847  0.694  1.605 1.525  1.064  0.384  0.523
## 106  0.893 0.650 0.618  1.185 0.918  0.478  1.237 0.946  0.950  0.498  0.310
## 107  1.270 1.604 1.564  1.519 0.724  1.911  1.085 1.434  1.323  2.602  1.373
## 109  0.766 0.664 1.037  0.480 0.961  0.929  0.649 0.334  0.696  1.431  0.214
## 111  1.146 0.833 0.626  0.647 0.280  0.720  0.728 0.989  0.844  2.353  0.663
## 112  0.594 0.621 0.775  0.829 0.891  0.358  0.664 0.355  0.417  1.025  0.331
## 113  0.513 0.875 0.938  0.911 1.108  1.119  1.041 1.131  1.365  1.420  1.102
## 114  1.291 0.905 0.950  0.745 0.717  0.810  0.860 0.879  0.764  2.074  0.819
## 115  1.440 1.382 1.670  0.899 0.663  0.955  1.931 1.385  1.405  0.480  1.657
## 118  0.640 0.580 0.682  0.505 0.599  0.838  0.735 0.559  0.900  1.188  1.132
## 119  0.592 0.963 0.982  0.879 1.366  0.997  0.904 0.512  0.648  1.030  0.771
## 120  0.689 0.785 0.781  0.755 0.938  0.707  0.763 0.628  0.865  1.111  0.754
## 122  0.583 1.246 1.238  1.214 1.396  1.097  0.933 0.548  0.960  1.630  1.207
## 123  1.669 0.942 1.401  0.699 0.670  0.996  1.398 1.271  1.080  1.243  1.013
## 125  0.506 0.681 0.802  0.515 0.834  0.736  0.846 0.407  0.553  1.177  0.596
## 126  1.360 1.353 1.360  1.490 1.389  1.444  1.060 1.321  0.968  2.020  1.671
## 127  0.499 0.401 0.690  0.313 0.381  0.312  0.537 0.294  0.797  1.076  0.865
## 129  0.549 0.730 0.894  0.365 0.806  0.930  0.503 0.558  1.053  0.306  1.026
## 132  1.381 0.916 1.645  0.851 0.806  1.183  1.643 1.103  1.468  0.452  1.403
## 133  1.684 1.786 0.490  1.760 0.923  1.221  2.729 1.759  1.397  0.306  0.757
## 136  1.745 1.108 1.593  1.029 1.188  1.389  0.930 1.069  1.160  2.020  1.698
## 137  0.481 0.683 0.589  0.437 1.045  0.581  0.647 0.384  0.585  1.105  0.812
## 138  0.634 0.676 0.653  0.600 0.932  0.855  0.507 0.495  0.918  1.203  0.510
## 141  0.448 0.551 0.306  0.351 0.678  0.796  0.727 0.347  1.119  1.138  0.231
```

```
## 142  1.266 1.526 1.207  1.160 1.252  1.507  2.074 1.432  1.223  0.100  1.071
## 143  1.027 1.030 0.788  0.913 0.762  0.683  1.146 1.129  0.909  1.254  1.022
## 144  0.572 0.420 0.238  0.033 0.443  0.391  0.237 0.564  0.059  0.598  0.673
## 145  0.502 0.790 0.738  0.576 0.841  0.707  0.844 0.567  0.821  0.868  0.695
## 146  0.165 0.542 0.778  0.545 1.169  1.179  0.872 0.283  1.313  1.557  0.956
## 147  0.225 0.776 0.776  0.698 1.182  1.204  0.816 0.585  1.301  1.426  0.852
## 151  0.613 1.386 1.089  1.300 1.759  1.504  1.702 1.619  1.393 -0.341  1.398
## 152  0.661 0.891 0.838  0.778 0.814  0.838  0.652 0.537  0.728  1.104  0.840
## 153  0.762 1.021 0.527  1.006 0.211  1.023  0.650 0.362  1.034  1.290  0.833
## 156  0.496 0.671 0.519  0.234 0.658  0.252  0.438 0.342  0.317  1.007  0.388
## 157  0.609 1.074 0.721  0.394 0.511  0.915  0.252 0.259  0.897  0.326  0.601
## 158  0.490 0.754 0.769  0.682 0.813  0.809  0.555 0.604  0.869  1.063  0.791
## 159  0.825 0.733 0.795  0.687 0.782  0.831  0.875 0.574  0.718  1.065  0.620
## 161  1.285 1.700 0.366  0.781 0.881  0.835  2.147 1.752  1.274  0.403  0.765
## 162  1.165 0.681 1.458  1.062 1.032  1.561  0.775 0.649  1.423  1.122  1.615
## 163  0.743 0.893 1.060  0.567 0.865  0.821  1.071 0.520  0.651  1.177  0.531
## 164  0.970 1.436 1.179  1.228 0.842  1.652  0.989 1.162  1.114  2.001  1.444
## 165  1.537 1.220 0.145  0.556 0.298  0.514  2.126 1.335  1.617  1.167  0.497
## 168  1.074 1.167 1.385  1.430 1.321  1.595  1.021 1.099  1.668  1.135  1.447
## 169  0.522 0.009 0.166  0.562 0.898  1.813  0.385 0.444  0.690  1.311  1.147
## 171  1.684 1.135 1.636  0.852 0.408  0.832  1.808 1.260  1.362  0.696  1.280
## 173  0.884 1.092 0.981  0.975 0.542  1.202  0.706 0.906  1.028  2.180  0.893
## 174  1.168 1.425 1.150  1.157 1.366  1.370  1.202 1.294  0.703  1.432  1.187
## 176  0.734 0.518 0.719  0.304 0.513  0.537  0.813 0.500  0.820  1.019  0.927
## 182  0.830 0.820 1.047  0.465 1.070  0.845  0.958 0.677  1.290  1.091  1.057
## 183  0.516 0.453 0.791  0.874 1.031  0.361  0.721 0.575  0.662  1.083  0.446
## 185  1.406 0.812 1.598  1.004 0.902  1.526  0.835 0.864  1.360  0.908  1.613
## 186  0.698 0.852 0.759  0.673 0.722  0.496  0.496 0.421  0.783  1.105  0.739
## 188  0.573 0.643 0.864  0.517 0.941  0.758  0.752 0.436  0.523  1.177  0.642
## 189  0.689 0.627 0.910  0.438 1.000  0.739  0.681 0.505  0.504  1.200  0.684
## 191  0.781 1.010 1.069  1.097 1.426  1.003  0.980 1.076  1.414  1.509  1.074
## 192  1.071 1.566 0.914  1.198 1.825  1.485  1.938 1.954  1.432 -0.279  1.267
## 193  1.450 1.258 1.848  0.974 0.808  1.091  1.804 1.195  1.371  0.459  1.667
## 194  1.163 0.872 0.542  0.644 0.226  1.017  0.786 1.033  0.635  2.475  0.656
## 195  0.784 0.922 0.871  0.442 0.662  0.720  0.790 0.593  0.789  0.535  0.086
## 197  0.433 0.646 1.010  0.899 1.035  0.836  0.770 0.462  0.892  1.013  0.723
## 198  0.733 0.734 0.869  0.625 0.974  0.773  0.638 0.496  0.605  1.405  0.360
## 200  0.641 0.732 0.973  0.703 0.932  0.968  0.847 0.711  0.876  1.249  0.866
## 202  0.564 0.780 0.455  0.632 0.769  0.550  0.821 0.292  0.356  0.869  0.602
## 203  0.715 0.603 0.818  0.379 1.145  0.731  0.627 0.463  0.573  1.247  0.577
## 204  1.992 1.250 1.697  0.916 1.047  1.271  1.388 1.374  0.865  1.752  1.038
## 208  0.183 0.675 0.908  0.681 1.232  0.967  0.455 0.774  1.295  1.425  1.099
## 210  0.560 1.123 1.052  1.052 0.725  1.255  0.802 0.777  0.896  1.482  1.121
## 211  0.631 1.011 1.194  1.035 1.116  1.250  1.332 0.838  0.948 -0.050  0.851
## 212  0.786 0.951 0.990  0.863 1.153  1.026  1.143 0.212  0.398  0.695  0.537
## 213  0.616 0.782 0.887  0.541 0.821  0.739  0.994 0.444  0.637  1.054  0.419
## 214  1.226 0.610 0.324  0.458 0.802  0.586  0.131 0.719  0.508  0.261  0.447
## 216  0.401 0.452 0.360  0.462 0.536  0.394  0.921 0.712  0.438  0.878  0.669
## 217  0.626 0.864 0.912  0.676 0.933  0.674  0.760 0.518  0.816  1.227  0.601
## 218  0.693 0.722 1.043  0.385 0.838  0.892  0.506 0.199  0.671  1.092  0.118
## 219  0.689 0.827 0.518  0.640 0.820  0.607  0.882 0.331  0.361  0.930  0.730
## 220  0.855 0.728 0.559  0.554 0.196  0.587  0.519 0.722  0.831  2.326  0.581
## 221  1.296 1.249 1.387  1.550 1.210  1.406  0.903 1.351  0.938  1.898  1.579
## 222  0.834 1.021 0.893  0.913 1.095  0.998  1.195 0.935  0.957  1.219  0.921
```

```
## 224  0.263 0.711 0.871  0.606 0.948  0.623  0.780 0.438  0.306  1.210  0.956
## 225  0.004 0.487 0.355 -0.004 0.945 -0.260  0.127 0.078 -0.226  0.935  0.232
##     F2012 F2013  F2014  F2015 F2016 F2017 F2018 F2019 F2020  F2021  F2022
## 1   0.223 1.281  0.456  1.093 1.555 1.540 1.544 0.910 0.498  1.327  2.012
## 2   1.487 1.333  1.198  1.569 1.464 1.121 2.028 1.675 1.498  1.536  1.518
## 3   1.147 1.192  1.690  1.121 1.757 1.512 1.210 1.115 1.926  2.330  1.688
## 5   1.265 0.831  1.946  1.690 1.990 1.925 1.919 1.964 2.562  1.533  3.243
## 6   0.552 1.044  0.828  1.331 1.609 0.870 1.395 1.752 1.162  1.553  1.212
## 7   0.640 0.770  0.814  1.051 1.125 0.960 0.664 0.843 1.224  0.893  0.839
## 9   0.798 0.442  0.951  0.957 0.488 1.095 0.878 0.760 1.123  1.031  0.643
## 12  0.308 1.499  1.198  1.087 1.172 1.141 1.129 1.422 1.416  0.629  0.754
## 13  1.783 1.098  2.409  2.167 2.096 1.741 2.524 2.370 2.315  1.395  2.498
## 15  0.344 0.565  0.883  1.114 1.042 1.331 1.023 1.443 1.611  0.879  1.480
## 16  1.385 1.403  1.694  2.240 1.598 2.080 2.247 2.108 2.027  2.464  2.017
## 17  0.235 0.230  0.482  0.722 1.337 1.124 0.881 1.136 0.898  1.300  1.216
## 21  0.644 0.785  0.697  1.502 1.446 1.342 0.850 1.556 1.716  1.286  1.031
## 22  0.595 0.853  0.940  1.111 1.025 1.160 1.056 1.147 1.031  1.522  0.884
## 23  0.512 0.742  0.860  1.068 1.487 1.457 1.346 1.329 1.090  1.707  1.523
## 24  0.831 0.507  0.955  1.533 0.824 0.981 0.562 0.921 1.315  0.738  0.644
## 26  0.473 0.770 -0.092  1.546 1.469 0.017 0.734 1.525 0.493 -0.425 -1.305
## 27  1.023 0.922  1.153  1.516 1.457 1.363 1.148 1.517 1.477  1.154  0.926
## 28  0.610 0.782  0.878  1.065 1.204 0.971 0.703 0.915 1.317  0.956  0.875
## 29  0.912 1.195  1.028  1.281 1.740 1.468 1.410 1.624 1.783  1.458  1.446
## 30  1.678 1.476  1.196  1.438 1.899 0.954 2.192 2.112 2.037  1.629  1.831
## 31  0.492 0.849  0.888  1.111 1.075 1.212 1.156 1.065 1.044  1.624  0.802
## 34  0.875 1.005  0.614  1.081 1.473 1.095 0.787 1.552 1.401  0.912  0.948
## 35  0.416 0.707  0.882  1.160 1.213 1.165 1.156 1.450 1.281  1.470  1.044
## 36  2.144 1.182  0.288  1.231 2.373 1.480 0.477 1.311 1.128  2.515  1.268
## 38  0.491 0.865  0.697  0.983 1.222 1.224 1.145 1.264 1.140  1.268  1.032
## 39  0.553 1.013  0.856  1.294 0.939 1.026 1.527 1.306 1.192  1.146  0.738
## 40  0.699 0.434  0.488  0.848 1.022 0.873 0.538 0.683 0.947  0.877  0.407
## 41  0.530 0.763  0.703  1.175 0.770 1.338 1.183 1.776 1.882  2.017  1.432
## 42  0.530 0.763  0.703  1.175 0.770 1.338 1.183 1.776 1.882  2.017  1.432
## 43  0.626 1.073  1.062  1.297 1.319 1.573 1.361 1.422 1.620  1.701  1.906
## 44  0.668 0.834  0.854  1.249 1.080 0.820 1.137 1.397 1.583  1.073  0.874
## 46  0.523 1.003  0.976  1.053 1.546 1.320 1.450 1.483 1.692  1.658  1.480
## 48  0.258 0.455  0.158 -0.430 0.310 0.675 0.238 0.220 0.274  0.568  0.479
## 51  0.611 0.885  1.144  1.439 1.370 1.275 1.177 1.634 1.722  1.304  1.437
## 52  0.970 1.238  1.048  1.139 1.493 0.776 2.119 1.524 1.668  1.994  1.237
## 54  1.139 0.397  2.677  1.516 1.852 1.619 2.109 2.180 2.633  1.690  2.219
## 56  0.703 0.715  0.704  0.918 1.057 0.821 0.561 0.752 1.087  0.727  0.688
## 57  0.746 1.208  1.106  1.339 1.016 1.032 1.158 1.266 1.488  0.995  0.982
## 58  0.663 0.491  1.011  1.393 1.550 1.155 0.967 1.279 1.509  1.032  0.736
## 59  0.939 1.049  1.254  1.211 1.396 0.616 2.049 1.040 1.117  1.727  0.655
## 60  0.634 0.619  0.654  1.285 1.260 0.723 0.774 0.972 1.484  0.999  0.658
## 64  0.696 0.566  0.781  1.235 1.216 0.688 1.064 1.623 0.770  0.669  1.371
## 67  0.359 0.597  1.764  0.813 0.803 1.490 0.831 0.877 0.839  1.012  1.396
## 68  0.589 0.916  0.646  0.517 0.970 1.127 0.953 1.065 1.237  1.075  1.346
## 69  1.540 1.424  2.591  2.613 2.151 1.487 2.157 1.452 3.317  1.938  2.062
## 70  1.220 0.714  2.049  1.612 1.794 1.796 2.060 2.023 2.551  1.337  2.929
## 71  0.722 0.536  0.616  0.681 1.127 0.901 0.631 0.857 0.829  0.791  0.359
## 72  0.615 0.794  0.805  1.024 1.505 1.353 1.026 1.534 1.377  1.063  0.994
## 73  0.890 1.001  1.188  1.200 1.635 1.741 1.028 1.349 1.770  1.675  1.323
## 75  1.349 0.583  2.519  1.674 1.988 1.653 2.393 2.332 2.516  1.325  2.596
```

```
## 76  0.614 0.841  0.887  1.132 1.217 1.292 1.081 1.320 1.284  1.494  0.996
## 77  0.924 0.869  1.417  1.382 1.726 2.005 0.739 1.300 1.923  1.504  2.228
## 78  1.235 1.317  1.060  0.904 1.561 0.642 1.905 1.381 1.307  1.655  1.040
## 79  1.625 1.381  1.447  0.205 2.381 1.210 0.934 2.206 1.274  2.482  1.413
## 80  0.584 0.776  0.641  0.837 0.945 0.920 0.543 1.169 1.235  0.767  0.698
## 81  0.671 0.750  0.763  0.998 1.095 0.907 0.620 0.803 1.160  0.826  0.773
## 82  0.520 0.624  0.638  1.143 1.425 1.069 0.884 1.418 1.728  1.406  0.916
## 83  0.556 1.068  0.857  1.155 1.167 1.522 1.188 1.408 1.260  1.559  1.195
## 84  0.795 1.055  1.168  1.192 1.572 1.674 1.125 1.419 1.663  1.660  1.295
## 85  0.958 0.894  1.071  1.352 1.506 1.149 1.137 1.178 1.400  0.875  1.066
## 86  0.759 1.133  1.306  1.384 1.164 1.061 1.277 1.507 1.537  0.883  1.095
## 87  1.492 0.866  1.370  1.518 1.598 1.318 1.837 1.591 1.734  1.546  2.028
## 88  0.639 0.915  0.666  1.126 1.368 1.034 0.804 1.233 1.813  1.098  0.723
## 89  1.727 1.159  2.229  2.067 1.890 1.336 2.524 2.353 1.990  1.430  2.142
## 90  0.667 0.687  1.660  0.419 1.411 1.694 0.820 1.339 0.786  0.921  1.201
## 91  0.516 0.451  0.530  0.711 1.088 0.966 0.874 0.802 0.520  0.733  0.790
## 92  0.459 0.799  0.812  0.841 1.488 1.055 0.973 1.118 1.322  1.110  1.085
## 93  1.090 1.642  1.079  1.856 1.669 1.737 2.044 1.597 1.346  2.176  2.370
## 94  1.293 1.263  1.175  1.940 1.672 1.572 2.406 1.626 1.857  2.644  2.147
## 95  0.705 0.568  1.357  0.449 1.040 1.264 0.783 1.201 1.075  1.019  1.764
## 96  0.610 0.428  1.515  0.441 1.118 1.367 0.881 1.175 1.199  1.020  1.840
## 97  1.035 1.108  0.871  1.331 1.607 0.735 2.003 1.212 1.451  1.786  1.079
## 98  1.543 1.006  1.638  1.704 1.716 1.606 1.834 1.698 1.902  1.569  2.135
## 100 0.395 0.628  0.560  0.833 1.323 0.796 0.926 1.272 1.437  1.270  1.335
## 101 1.067 1.002  0.787  1.429 1.641 0.920 1.972 1.281 1.617  1.923  1.358
## 103 1.026 0.930  1.024  1.164 1.237 1.500 0.675 1.624 1.344  1.421  1.280
## 105 0.419 0.304  1.518  1.217 1.419 1.593 0.863 1.826 1.864  1.857  1.610
## 106 0.402 0.519  0.987  0.944 1.637 1.459 0.966 1.485 1.551  1.762  1.659
## 107 1.562 1.349  1.451  2.104 1.695 1.962 2.358 1.895 1.975  2.676  2.275
## 109 1.048 1.220  0.837  1.497 1.519 1.243 0.955 2.200 1.719  1.287  1.112
## 111 1.045 1.260  1.051  1.383 1.629 1.023 2.154 1.412 1.623  2.039  1.290
## 112 0.660 0.867  1.091  1.529 2.015 1.215 1.101 1.668 0.791  1.204  1.372
## 113 0.869 0.983  0.934  1.288 1.412 1.539 1.306 1.494 1.593  1.474  1.556
## 114 0.770 1.240  1.237  0.711 1.587 0.525 1.737 0.920 1.174  1.924  0.559
## 115 1.611 0.927  2.232  2.046 2.028 1.795 2.260 2.079 2.367  1.232  2.534
## 118 0.880 0.749  0.777  1.134 1.147 1.379 0.983 1.438 1.137  1.194  0.860
## 119 0.925 0.676  1.129  1.141 1.361 1.016 1.022 1.220 1.306  0.762  0.816
## 120 0.901 1.121  1.199  1.372 1.836 1.419 1.443 1.700 1.688  1.473  1.367
## 122 0.426 0.969  0.787  1.017 1.089 1.347 1.040 1.089 1.010  1.687  0.887
## 123 1.440 1.343  1.507  1.403 1.748 1.224 1.441 1.290 1.643  2.123  1.955
## 125 0.699 0.714  0.674  0.892 1.034 0.800 0.540 0.752 1.092  0.716  0.684
## 126 0.942 1.588  1.480  1.563 1.825 2.141 1.086 1.435 1.919  1.855  1.711
## 127 0.665 0.797  0.905  1.158 1.084 1.319 1.051 1.462 1.109  0.987  0.595
## 129 0.948 0.798  0.911  1.141 1.346 1.629 1.240 1.378 1.726  1.163  1.249
## 132 1.396 0.724  1.811  1.902 1.773 1.962 1.940 1.919 2.200  1.500  2.737
## 133 0.230 1.024  1.879  2.131 1.391 2.493 2.207 1.847 2.353  1.994  2.197
## 136 1.299 1.233  1.603  1.115 1.840 2.131 0.597 1.466 2.107  1.798  2.303
## 137 0.746 0.479  0.716  1.034 1.262 0.837 0.810 1.209 1.026  0.687  0.834
## 138 0.915 0.986  0.902  1.245 1.443 1.328 1.064 1.726 1.669  1.656  1.436
## 141 0.402 0.189  0.337  0.654 1.169 1.071 0.627 0.854 0.229  0.632  1.132
## 142 1.149 0.427  2.564  1.290 1.936 1.731 2.135 2.142 2.483  1.316  2.601
## 143 0.870 1.026  1.005  1.215 2.026 1.768 1.384 1.303 1.764  1.689  2.421
## 144 0.125 0.999  0.544  0.568 1.214 0.627 1.173 1.118 0.912  0.982  1.319
## 145 0.683 1.201  0.802  1.018 1.315 1.025 0.900 1.161 1.526  1.026  0.842
```

```
## 146 0.588 0.809  0.987  0.832 0.933 0.843 1.065 0.943 0.776  1.425  0.428
## 147 0.526 0.922  1.012  1.187 1.168 1.170 1.093 1.229 1.127  1.559  0.791
## 151 1.063 0.791  2.412  1.781 1.718 1.551 1.485 1.208 2.389  1.499  1.918
## 152 0.754 0.473  0.485  1.213 0.933 1.421 1.121 0.890 0.496  1.329  1.055
## 153 0.263 0.778  0.358  0.529 1.233 1.252 1.359 0.566 0.394  1.121  1.389
## 156 0.295 0.800  0.393  0.160 1.129 0.790 0.662 0.695 1.082  1.180  1.221
## 157 0.825 0.327  1.119  1.493 0.250 1.150 0.539 1.276 1.369  0.696  0.649
## 158 0.808 0.647  0.883  1.256 1.454 0.978 0.734 1.048 1.778  1.287  0.878
## 159 0.912 1.057  0.960  1.155 1.603 1.300 1.329 1.407 1.560  1.431  1.405
## 161 1.383 0.651  2.380  2.013 2.056 1.475 2.434 2.652 2.677  1.466  2.056
## 162 0.797 0.941  1.349  1.405 1.682 2.109 0.906 1.291 1.990  1.251  2.318
## 163 0.762 0.774  0.869  1.093 1.203 0.967 0.848 0.950 1.349  0.922  0.848
## 164 1.376 1.212  1.541  1.971 1.515 1.893 2.004 1.840 1.734  2.165  1.855
## 165 1.828 1.370  1.552  1.799 1.876 1.153 2.266 2.241 2.256  1.447  1.949
## 168 1.255 1.218  1.322  1.902 1.647 1.370 1.609 1.645 1.407  1.747  1.686
## 169 1.992 1.292  0.375  0.106 0.854 0.360 0.682 0.050 0.742  2.320  1.944
## 171 1.687 0.992  1.607  1.833 1.768 1.700 1.971 1.822 1.995  1.529  2.115
## 173 1.241 1.204  1.249  1.867 1.533 1.780 1.887 1.690 1.488  2.203  1.745
## 174 0.834 1.180  1.105  1.212 1.542 1.744 0.964 1.396 1.665  1.782  1.405
## 176 0.922 0.749  0.863  1.169 1.100 1.184 0.917 1.377 1.434  1.032  0.872
## 182 0.976 1.089  1.121  1.467 1.267 1.623 0.709 1.528 1.724  1.532  1.449
## 183 0.508 0.655  0.838  1.300 1.562 1.103 1.016 1.811 0.890  0.809  1.094
## 185 1.043 0.906  1.603  1.533 1.714 2.036 1.149 1.534 2.083  1.431  2.489
## 186 0.977 0.862  0.997  1.006 1.369 1.095 0.823 1.275 1.315  1.034  1.004
## 188 0.625 0.744  0.619  0.861 0.999 0.844 0.532 0.967 1.161  0.732  0.689
## 189 0.581 0.773  0.642  0.839 0.949 0.911 0.539 1.169 1.229  0.761  0.698
## 191 0.986 1.118  1.136  1.309 1.790 1.439 1.250 1.530 1.682  1.277  1.296
## 192 1.313 0.857  2.704  2.069 1.841 1.588 1.844 1.568 2.943  1.846  2.110
## 193 1.512 0.782  2.169  1.972 1.859 1.837 2.343 2.096 2.514  1.181  2.798
## 194 1.044 1.383  1.213  1.319 1.796 1.142 2.389 1.562 1.868  2.238  1.535
## 195 0.376 0.685  0.704  0.718 1.010 1.351 1.108 1.304 1.728  1.898  1.383
## 197 0.820 0.885  0.935  1.102 0.995 1.450 1.055 1.399 1.091  1.126  0.911
## 198 1.023 1.234  0.845  1.392 1.659 1.202 0.954 1.857 1.596  1.112  1.014
## 200 0.571 0.754  0.923  1.096 1.125 1.243 1.123 1.273 1.134  1.554  0.975
## 202 0.671 0.807  0.713  0.759 1.284 1.077 1.021 1.599 1.398  1.190  0.846
## 203 0.626 0.792  0.692  0.824 0.925 1.177 0.667 1.191 1.395  0.952  0.714
## 204 1.607 1.470  1.879  1.192 1.896 1.377 1.507 1.340 2.015  2.555  2.291
## 208 1.117 1.060  1.136  1.159 1.262 1.735 1.102 1.616 1.236  1.499  1.416
## 210 1.086 0.739  0.909  1.556 1.059 1.632 1.498 1.204 1.210  1.699  1.482
## 211 0.576 0.364  1.718  0.614 1.161 1.424 0.998 1.231 1.373  0.929  1.911
## 212 1.448 0.614  0.501  1.531 2.224 1.433 1.276 1.034 1.324  1.144  1.217
## 213 0.619 0.755  0.882  1.071 1.162 0.964 0.722 0.898 1.320  0.922  0.894
## 214 0.836 0.149  1.162  1.048 0.301 1.546 1.196 0.766 0.890  0.790  0.382
## 216 0.402 0.706  0.585  0.573 1.146 1.131 0.613 0.897 1.226  1.147  1.479
## 217 0.513 0.941  0.865  1.094 1.098 0.726 0.843 1.235 1.350  0.734  0.533
## 218 0.736 0.895  0.540  1.222 1.191 1.121 0.817 1.811 1.477  1.114  1.033
## 219 0.701 0.773  0.686  0.724 1.267 1.062 0.920 1.379 1.274  1.029  0.951
## 220 1.043 1.114  0.863  1.326 1.615 0.735 2.007 1.204 1.455  1.787  1.074
## 221 1.344 1.423  1.401  1.510 1.732 2.204 0.942 1.477 2.069  1.593  1.970
## 222 1.074 1.016  1.053  1.412 1.660 1.429 1.290 1.444 1.711  1.447  1.394
## 224 0.972 0.790  0.917  1.450 1.401 0.105 0.648 0.855 0.891  0.822  0.686
## 225 0.334 0.118  0.025  0.970 1.270 0.088 0.453 0.925 0.389 -0.125 -0.490
##     F2022_Fahrenheit
## 1            35.6216
```

```
## 2           34.7324
## 3           35.0384
## 5           37.8374
## 6           34.1816
## 7           33.5102
## 9           33.1574
## 12          33.3572
## 13          36.4964
## 15          34.6640
## 16          35.6306
## 17          34.1888
## 21          33.8558
## 22          33.5912
## 23          34.7414
## 24          33.1592
## 26          29.6510
## 27          33.6668
## 28          33.5750
## 29          34.6028
## 30          35.2958
## 31          33.4436
## 34          33.7064
## 35          33.8792
## 36          34.2824
## 38          33.8576
## 39          33.3284
## 40          32.7326
## 41          34.5776
## 42          34.5776
## 43          35.4308
## 44          33.5732
## 46          34.6640
## 48          32.8622
## 51          34.5866
## 52          34.2266
## 54          35.9942
## 56          33.2384
## 57          33.7676
## 58          33.3248
## 59          33.1790
## 60          33.1844
## 64          34.4678
## 67          34.5128
## 68          34.4228
## 69          35.7116
## 70          37.2722
## 71          32.6462
## 72          33.7892
## 73          34.3814
## 75          36.6728
## 76          33.7928
## 77          36.0104
## 78          33.8720
## 79          34.5434
```

```
## 80           33.2564
## 81           33.3914
## 82           33.6488
## 83           34.1510
## 84           34.3310
## 85           33.9188
## 86           33.9710
## 87           35.6504
## 88           33.3014
## 89           35.8556
## 90           34.1618
## 91           33.4220
## 92           33.9530
## 93           36.2660
## 94           35.8646
## 95           35.1752
## 96           35.3120
## 97           33.9422
## 98           35.8430
## 100          34.4030
## 101          34.4444
## 103          34.3040
## 105          34.8980
## 106          34.9862
## 107          36.0950
## 109          34.0016
## 111          34.3220
## 112          34.4696
## 113          34.8008
## 114          33.0062
## 115          36.5612
## 118          33.5480
## 119          33.4688
## 120          34.4606
## 122          33.5966
## 123          35.5190
## 125          33.2312
## 126          35.0798
## 127          33.0710
## 129          34.2482
## 132          36.9266
## 133          35.9546
## 136          36.1454
## 137          33.5012
## 138          34.5848
## 141          34.0376
## 142          36.6818
## 143          36.3578
## 144          34.3742
## 145          33.5156
## 146          32.7704
## 147          33.4238
## 151          35.4524
## 152          33.8990
```

```
## 153          34.5002
## 156          34.1978
## 157          33.1682
## 158          33.5804
## 159          34.5290
## 161          35.7008
## 162          36.1724
## 163          33.5264
## 164          35.3390
## 165          35.5082
## 168          35.0348
## 169          35.4992
## 171          35.8070
## 173          35.1410
## 174          34.5290
## 176          33.5696
## 182          34.6082
## 183          33.9692
## 185          36.4802
## 186          33.8072
## 188          33.2402
## 189          33.2564
## 191          34.3328
## 192          35.7980
## 193          37.0364
## 194          34.7630
## 195          34.4894
## 197          33.6398
## 198          33.8252
## 200          33.7550
## 202          33.5228
## 203          33.2852
## 204          36.1238
## 208          34.5488
## 210          34.6676
## 211          35.4398
## 212          34.1906
## 213          33.6092
## 214          32.6876
## 216          34.6622
## 217          32.9594
## 218          33.8594
## 219          33.7118
## 220          33.9332
## 221          35.5460
## 222          34.5092
## 224          33.2348
## 225          31.1180
```

Reorder Multiple Rows in Descending Order

```r
ordered_df <- df[order(df$Country, -df$F2022), ]
print("Ordered by Country, then F2022 (descending):")
```

```
## [1] "Ordered by Country, then F2022 (descending):"
```

```r
head(ordered_df)
```

```
##   ObjectId                      Country ISO2 ISO3
## 1        1 Afghanistan, Islamic Rep. of   AF  AFG
## 2        2                      Albania   AL  ALB
## 3        3                      Algeria   DZ  DZA
## 5        5     Andorra, Principality of   AD  AND
## 6        6                       Angola   AO  AGO
## 7        7                     Anguilla   AI  AIA
##                                                                                 Indicator
## 1 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 2 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 3 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 5 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 6 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 7 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
##             Unit
## 1 Degree Celsius
## 2 Degree Celsius
## 3 Degree Celsius
## 5 Degree Celsius
## 6 Degree Celsius
## 7 Degree Celsius
##
## 1 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 2 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 3 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 5 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 6 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
## 7 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clima
##   CTS_Code                   CTS_Name
## 1     ECCS Surface Temperature Change
## 2     ECCS Surface Temperature Change
## 3     ECCS Surface Temperature Change
## 5     ECCS Surface Temperature Change
## 6     ECCS Surface Temperature Change
## 7     ECCS Surface Temperature Change
##                                                          CTS_Full_Descriptor
## 1 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 2 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 3 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 5 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 6 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 7 Environment, Climate Change, Climate Indicators, Surface Temperature Change
##    F1961  F1962  F1963  F1964  F1965  F1966  F1967  F1968  F1969  F1970  F1971
## 1 -0.113 -0.164  0.847 -0.764 -0.244  0.226 -0.371 -0.423 -0.539  0.813  0.619
## 2  0.627  0.326  0.075 -0.166 -0.388  0.559 -0.074  0.081 -0.013 -0.106 -0.195
```

```
## 3  0.164  0.114  0.077  0.250 -0.100  0.433 -0.026 -0.067  0.291  0.116 -0.385
## 5  0.736  0.112 -0.752  0.308 -0.490  0.415  0.637  0.018 -0.137  0.121 -0.326
## 6  0.041 -0.152 -0.190 -0.229 -0.196  0.175 -0.081 -0.193  0.188  0.248 -0.097
## 7  0.086 -0.024  0.234  0.189 -0.365 -0.001 -0.257 -0.200  0.317  0.082 -0.269
##    F1972  F1973  F1974  F1975  F1976  F1977  F1978 F1979  F1980  F1981  F1982
## 1 -1.124  0.232 -0.489 -0.445 -0.286  0.513  0.129 0.361  0.600  0.483 -0.346
## 2 -0.069 -0.288 -0.139 -0.211 -0.683  0.545 -0.814 0.203 -0.414 -0.351  0.173
## 3 -0.348 -0.015 -0.503 -0.539 -0.782  0.504  0.012 0.654  0.232  0.215  0.399
## 5 -0.499  0.025 -0.371  0.246 -0.045 -0.093 -0.163 0.058 -0.188  0.178  1.044
## 6 -0.035  0.475 -0.158 -0.029 -0.313  0.272  0.037 0.291  0.279 -0.071  0.164
## 7 -0.179  0.170 -0.370 -0.334 -0.426  0.096  0.130 0.034  0.698  0.532  0.097
##    F1983  F1984  F1985  F1986  F1987 F1988  F1989 F1990  F1991  F1992 F1993
## 1  0.164  0.145  0.283 -0.141  0.391 0.919 -0.205 0.730 -0.168 -0.294 0.220
## 2 -0.128 -0.270 -0.103  0.569 -0.106 0.370 -0.066 0.795 -0.269  0.106 0.076
## 3  0.560 -0.004  0.508  0.296  0.975 1.304  0.386 1.266  0.031 -0.312 0.552
## 5  0.859 -0.157  0.059  0.387  0.397 0.883  1.162 1.736  0.231  0.386 0.174
## 6  0.487  0.631  0.694  0.176  0.689 0.572 -0.055 0.687  0.341  0.466 0.256
## 7  0.524  0.105  0.006  0.013  0.569 0.457 -0.002 0.432  0.441  0.365 0.535
##   F1994  F1995  F1996 F1997 F1998 F1999 F2000 F2001 F2002 F2003 F2004 F2005
## 1 0.430  0.359 -0.116 0.471 0.675 1.198 0.993 1.311 1.365 0.587 1.373 0.401
## 2 1.330 -0.172 -0.038 0.075 0.795 0.670 1.065 1.532 0.492 0.970 0.444 0.189
## 3 0.732  0.595  0.846 1.059 1.109 1.476 0.820 1.856 1.258 1.585 0.988 1.264
## 5 1.508  1.279  0.570 1.788 1.018 1.055 1.050 1.480 0.835 1.949 0.936 0.851
## 6 0.212  0.753  0.370 0.107 1.064 0.417 0.169 0.295 0.735 0.889 0.414 1.021
## 7 0.575  0.651  0.350 0.459 1.060 0.532 0.264 0.587 0.706 0.816 0.521 0.828
##   F2006 F2007 F2008 F2009 F2010 F2011 F2012 F2013 F2014 F2015 F2016 F2017 F2018
## 1 1.720 0.675 0.704 0.895 1.613 1.397 0.223 1.281 0.456 1.093 1.555 1.540 1.544
## 2 0.345 1.316 0.978 0.910 1.191 1.055 1.487 1.333 1.198 1.569 1.464 1.121 2.028
## 3 1.395 1.220 1.185 0.945 2.265 1.398 1.147 1.192 1.690 1.121 1.757 1.512 1.210
## 5 1.485 1.024 0.946 1.413 0.471 1.677 1.265 0.831 1.946 1.690 1.990 1.925 1.919
## 6 0.561 0.885 0.501 0.708 1.194 0.880 0.552 1.044 0.828 1.331 1.609 0.870 1.395
## 7 0.691 0.957 0.411 0.566 1.090 0.489 0.640 0.770 0.814 1.051 1.125 0.960 0.664
##   F2019 F2020 F2021 F2022 F2022_Fahrenheit
## 1 0.910 0.498 1.327 2.012          35.6216
## 2 1.675 1.498 1.536 1.518          34.7324
## 3 1.115 1.926 2.330 1.688          35.0384
## 5 1.964 2.562 1.533 3.243          37.8374
## 6 1.752 1.162 1.553 1.212          34.1816
## 7 0.843 1.224 0.893 0.839          33.5102
```

Renaming Columns

```
colnames(df)[colnames(df) == "F2022"] <- "Temperature_2022"
colnames(df)[colnames(df) == "F2021"] <- "Temperature_2021"
ls(df)
```

```
##  [1] "Country"             "CTS_Code"            "CTS_Full_Descriptor"
##  [4] "CTS_Name"            "F1961"               "F1962"
##  [7] "F1963"               "F1964"               "F1965"
## [10] "F1966"               "F1967"               "F1968"
## [13] "F1969"               "F1970"               "F1971"
## [16] "F1972"               "F1973"               "F1974"
```

```
## [19] "F1975"              "F1976"              "F1977"
## [22] "F1978"              "F1979"              "F1980"
## [25] "F1981"              "F1982"              "F1983"
## [28] "F1984"              "F1985"              "F1986"
## [31] "F1987"              "F1988"              "F1989"
## [34] "F1990"              "F1991"              "F1992"
## [37] "F1993"              "F1994"              "F1995"
## [40] "F1996"              "F1997"              "F1998"
## [43] "F1999"              "F2000"              "F2001"
## [46] "F2002"              "F2003"              "F2004"
## [49] "F2005"              "F2006"              "F2007"
## [52] "F2008"              "F2009"              "F2010"
## [55] "F2011"              "F2012"              "F2013"
## [58] "F2014"              "F2015"              "F2016"
## [61] "F2017"              "F2018"              "F2019"
## [64] "F2020"              "F2022_Fahrenheit"   "Indicator"
## [67] "ISO2"               "ISO3"               "ObjectId"
## [70] "Source"             "Temperature_2021"   "Temperature_2022"
## [73] "Unit"
```

Adding New Variables

```
#adding new column F2022_x_2 which is F2022 multiplied by 2
df$F2022_x_2 <- df$Temperature_2022 * 2
ls(df)
```

```
##  [1] "Country"             "CTS_Code"            "CTS_Full_Descriptor"
##  [4] "CTS_Name"            "F1961"               "F1962"
##  [7] "F1963"               "F1964"               "F1965"
## [10] "F1966"               "F1967"               "F1968"
## [13] "F1969"               "F1970"               "F1971"
## [16] "F1972"               "F1973"               "F1974"
## [19] "F1975"               "F1976"               "F1977"
## [22] "F1978"               "F1979"               "F1980"
## [25] "F1981"               "F1982"               "F1983"
## [28] "F1984"               "F1985"               "F1986"
## [31] "F1987"               "F1988"               "F1989"
## [34] "F1990"               "F1991"               "F1992"
## [37] "F1993"               "F1994"               "F1995"
## [40] "F1996"               "F1997"               "F1998"
## [43] "F1999"               "F2000"               "F2001"
## [46] "F2002"               "F2003"               "F2004"
## [49] "F2005"               "F2006"               "F2007"
## [52] "F2008"               "F2009"               "F2010"
## [55] "F2011"               "F2012"               "F2013"
## [58] "F2014"               "F2015"               "F2016"
## [61] "F2017"               "F2018"               "F2019"
## [64] "F2020"               "F2022_Fahrenheit"    "F2022_x_2"
## [67] "Indicator"           "ISO2"                "ISO3"
## [70] "ObjectId"            "Source"              "Temperature_2021"
## [73] "Temperature_2022"    "Unit"
```

Creating a Training Set

```r
#setting seed for reproducibility
set.seed(123)
#creating a vector of random numbers
train_index <- sample(seq_len(nrow(df)), 0.8 * nrow(df))
#create training set
train_set <- df[train_index, ]
#display top 15 rows of train dataset
head(train_set, 15)
```

```
##     ObjectId                         Country ISO2 ISO3
## 22        22                           Benin   BJ  BEN
## 73        73                     Gambia, The   GM  GMB
## 164      164                           Qatar   QA  QAT
## 64        64            Eswatini, Kingdom of   SZ  SWZ
## 225      225                        Zimbabwe   ZW  ZWE
## 222      222                           World       WLD
## 122      122                            Mali   ML  MLI
## 123      123                           Malta   MT  MLT
## 217      217 Venezuela, Rep. Bolivariana de   VE  VEN
## 125      125                       Martinique   MQ  MTQ
## 197      197       Tanzania, United Rep. of   TZ  TZA
## 137      137            Mozambique, Rep. of   MZ  MOZ
## 96        96                     Isle of Man   IM  IMN
## 38        38            Central African Rep.   CF  CAF
## 9          9                       Argentina   AR  ARG
##                                                                                                                  Indicator
## 22  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 73  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 164 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 64  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 225 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 222 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 122 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 123 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 217 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 125 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 197 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 137 Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 96  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 38  Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
## 9   Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980
##                Unit
## 22  Degree Celsius
## 73  Degree Celsius
## 164 Degree Celsius
## 64  Degree Celsius
## 225 Degree Celsius
## 222 Degree Celsius
## 122 Degree Celsius
## 123 Degree Celsius
## 217 Degree Celsius
```

```
## 125 Degree Celsius
## 197 Degree Celsius
## 137 Degree Celsius
## 96  Degree Celsius
## 38  Degree Celsius
## 9   Degree Celsius
##
## 22  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 73  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 164 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 64  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 225 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 222 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 122 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 123 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 217 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 125 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 197 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 137 Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 96  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 38  Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
## 9   Food and Agriculture Organization of the United Nations (FAO). 2022. FAOSTAT Climate Change, Clir
##     CTS_Code                    CTS_Name
## 22      ECCS Surface Temperature Change
## 73      ECCS Surface Temperature Change
## 164     ECCS Surface Temperature Change
## 64      ECCS Surface Temperature Change
## 225     ECCS Surface Temperature Change
## 222     ECCS Surface Temperature Change
## 122     ECCS Surface Temperature Change
## 123     ECCS Surface Temperature Change
## 217     ECCS Surface Temperature Change
## 125     ECCS Surface Temperature Change
## 197     ECCS Surface Temperature Change
## 137     ECCS Surface Temperature Change
## 96      ECCS Surface Temperature Change
## 38      ECCS Surface Temperature Change
## 9       ECCS Surface Temperature Change
##                                                          CTS_Full_Descriptor
## 22  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 73  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 164 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 64  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 225 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 222 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 122 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 123 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 217 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 125 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 197 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 137 Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 96  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 38  Environment, Climate Change, Climate Indicators, Surface Temperature Change
## 9   Environment, Climate Change, Climate Indicators, Surface Temperature Change
```

```
##      F1961  F1962  F1963  F1964  F1965  F1966  F1967  F1968  F1969  F1970
## 22  -0.137 -0.240  0.152 -0.218 -0.094 -0.007 -0.252 -0.129  0.303  0.305
## 73  -0.138 -0.047  0.130 -0.192 -0.463 -0.086 -0.381 -0.547  0.832  0.399
## 164 -0.542  0.518  0.449 -0.400  0.386  0.439 -0.252 -0.536  0.668  0.267
## 64   0.268  0.433 -0.210  0.022 -0.224  0.295 -0.274 -0.431  0.346  0.500
## 225  0.267  0.237 -0.458 -0.097 -0.480  0.215 -0.043  0.093  0.215  0.421
## 222  0.211  0.038  0.168 -0.246 -0.223  0.201 -0.117 -0.126 -0.092  0.150
## 122 -0.301 -0.145  0.213 -0.130 -0.299  0.005 -0.124 -0.287  0.665  0.365
## 123  0.551  0.350 -0.204  0.260 -0.218  0.149  0.131 -0.033 -0.129 -0.144
## 217  0.072 -0.113 -0.012  0.097 -0.096  0.189 -0.199 -0.173  0.514  0.217
## 125 -0.040  0.151  0.243  0.062 -0.283  0.067 -0.246 -0.213  0.403  0.186
## 197  0.334 -0.260 -0.270 -0.397 -0.242  0.050  0.027 -0.474  0.350  0.193
## 137  0.391  0.031 -0.435 -0.180 -0.596  0.143  0.120 -0.373  0.289  0.228
## 96   0.358 -0.746 -0.820  0.095 -0.579 -0.100  0.105  0.035 -0.287  0.049
## 38  -0.003 -0.306  0.037 -0.136 -0.050  0.064 -0.229 -0.168  0.143  0.245
## 9    0.122 -0.046  0.162 -0.343  0.090 -0.163  0.000  0.472  0.292  0.438
##      F1971  F1972  F1973  F1974  F1975  F1976  F1977  F1978  F1979  F1980
## 22  -0.183  0.080  0.627  0.089 -0.274 -0.194  0.357 -0.045  0.499  0.425
## 73  -0.054  0.311  0.685 -0.212 -0.164 -0.057  0.489  0.422  0.630  0.820
## 164 -0.152 -0.731 -0.255 -0.336 -0.281 -0.556  0.274  0.149  0.765  0.389
## 64  -0.002 -0.395  0.112 -0.233 -0.353 -0.436  0.305  0.188  0.234 -0.130
## 225 -0.052 -0.397  0.601 -0.485 -0.262 -0.436  0.433 -0.016  0.189 -0.024
## 222 -0.093 -0.199  0.269 -0.181  0.088 -0.314  0.269  0.001  0.226  0.332
## 122 -0.007  0.278  0.508 -0.435 -0.471 -0.374  0.362  0.360  0.646  0.970
## 123 -0.272 -0.294 -0.003 -0.251 -0.383 -0.706  0.304 -0.602  0.036 -0.504
## 217 -0.365 -0.029  0.313 -0.295 -0.300 -0.409  0.168  0.095  0.202  0.346
## 125 -0.193 -0.047  0.158 -0.395 -0.394 -0.415  0.020  0.082  0.166  0.401
## 197 -0.286  0.024  0.335 -0.122 -0.040  0.015  0.352  0.118 -0.090  0.410
## 137 -0.142 -0.222  0.262 -0.295 -0.163 -0.142  0.468  0.364  0.129  0.093
## 96   0.316 -0.190  0.297 -0.200  0.697  0.661 -0.339  0.209 -0.777 -0.031
## 38  -0.055  0.064  0.545 -0.058 -0.049 -0.117  0.203  0.044  0.380  0.439
## 9   -0.260 -0.008 -0.139 -0.106 -0.021 -0.321  0.432  0.362  0.266  0.373
##      F1981  F1982  F1983  F1984  F1985  F1986  F1987  F1988  F1989 F1990  F1991
## 22   0.161  0.211  0.548  0.542  0.411  0.307  0.977  0.631 -0.052 0.580  0.302
## 73   0.622  0.326  1.131  0.636  0.384  0.665  1.068  0.829  0.609 1.139  0.810
## 164  0.417 -0.130 -0.826  0.039  0.357  0.510  0.385  0.494 -0.069 0.406 -0.151
## 64  -0.429  0.170  0.915 -0.040  0.571  0.321  0.567  0.608  0.142 0.281  0.530
## 225 -0.360  0.170  1.223  0.483  0.027  0.025  1.070  0.447  0.181 0.567  0.192
## 222  0.443  0.086  0.460  0.127 -0.031  0.242  0.403  0.558  0.331 0.639  0.468
## 122  0.395  0.264  0.830  0.609  0.512  0.304  1.081  0.784  0.107 0.903  0.685
## 123 -0.344  0.623  0.037 -0.267  0.426  0.400  0.525  1.194  0.206 1.235  0.147
## 217  0.134  0.116  0.469 -0.107 -0.295 -0.163  0.415  0.161 -0.098 0.356  0.460
## 125  0.406  0.074  0.433 -0.029 -0.060  0.017  0.591  0.404 -0.001 0.424  0.445
## 197  0.387  0.437  0.724  0.125  0.094  0.174  0.598  0.657 -0.083 0.190  0.332
## 137 -0.188 -0.040  0.918  0.263 -0.008  0.103  0.679  0.588  0.092 0.368  0.125
## 96   0.292  0.076  0.381  0.356 -0.489 -0.684 -0.222  0.270  1.105 0.913  0.178
## 38   0.003  0.229  0.425  0.125  0.156  0.478  0.504  0.265 -0.148 0.347  0.612
## 9    0.378  0.359  0.046 -0.100  0.308  0.460  0.446 -0.192  0.611 0.436  0.261
##      F1992  F1993  F1994 F1995  F1996  F1997 F1998  F1999  F2000 F2001 F2002
## 22  -0.027  0.531  0.439 0.406  0.736  0.557 1.042  0.621  0.449 0.517 0.721
## 73   0.852  1.045  0.814 0.878  1.122  1.323 1.555  0.750  0.958 1.316 1.380
## 164 -0.519  0.031  0.666 0.064  0.496  0.066 1.174  1.735  0.944 0.970 1.436
## 64   1.147  0.733 -0.006 0.585 -0.042  0.235 0.991  0.505 -0.061 0.517 0.601
## 225  1.010  0.300 -0.085 0.685 -0.247 -0.025 0.801  0.030 -0.417 0.004 0.487
```

```
## 222  0.184  0.348  0.507 0.835  0.355  0.656 0.993  0.783  0.728 0.834 1.021
## 122  0.194  1.026  0.206 0.570  1.161  0.870 1.214  0.375  0.647 0.583 1.246
## 123  0.275  0.625  1.421 0.461  0.639  1.054 0.876  1.268  1.055 1.669 0.942
## 217  0.454  0.525  0.320 0.770  0.545  0.609 1.039  0.339  0.298 0.626 0.864
## 125  0.405  0.487  0.565 0.670  0.433  0.591 1.003  0.477  0.262 0.506 0.681
## 197  0.338  0.029  0.428 0.347  0.217  0.586 0.499 -0.232  0.530 0.433 0.646
## 137  0.759  0.299  0.087 0.555  0.111  0.209 0.949  0.288  0.375 0.481 0.683
## 96   0.462 -0.037  0.269 1.164 -0.112  0.924 0.928  1.112  0.636 0.516 0.891
## 38  -0.457  0.329  0.562 0.187  0.047  0.458 1.195  0.502  0.683 0.400 0.745
## 9   -0.261  0.086  0.487 0.259  0.512  0.759 0.351  0.160 -0.186 0.425 0.278
##     F2003  F2004 F2005  F2006  F2007 F2008  F2009  F2010 F2011 F2012 F2013
## 22  0.936  0.706 1.105  1.035  0.806 0.632  0.950  1.230 0.949 0.595 0.853
## 73  1.103  1.188 1.498  1.221  1.090 1.376  0.688  1.324 1.060 0.890 1.001
## 164 1.179  1.228 0.842  1.652  0.989 1.162  1.114  2.001 1.444 1.376 1.212
## 64  0.715  0.525 1.153  0.365  1.133 0.640  0.383  1.287 0.897 0.696 0.566
## 225 0.355 -0.004 0.945 -0.260  0.127 0.078 -0.226  0.935 0.232 0.334 0.118
## 222 0.893  0.913 1.095  0.998  1.195 0.935  0.957  1.219 0.921 1.074 1.016
## 122 1.238  1.214 1.396  1.097  0.933 0.548  0.960  1.630 1.207 0.426 0.969
## 123 1.401  0.699 0.670  0.996  1.398 1.271  1.080  1.243 1.013 1.440 1.343
## 217 0.912  0.676 0.933  0.674  0.760 0.518  0.816  1.227 0.601 0.513 0.941
## 125 0.802  0.515 0.834  0.736  0.846 0.407  0.553  1.177 0.596 0.699 0.714
## 197 1.010  0.899 1.035  0.836  0.770 0.462  0.892  1.013 0.723 0.820 0.885
## 137 0.589  0.437 1.045  0.581  0.647 0.384  0.585  1.105 0.812 0.746 0.479
## 96  1.049  0.952 1.165  1.229  1.321 0.829  0.874 -0.111 0.681 0.610 0.428
## 38  0.845  0.957 0.983  0.967  0.537 0.682  1.119  1.162 0.763 0.491 0.865
## 9   0.635  0.470 0.281  0.596 -0.169 0.601  0.857  0.135 0.386 0.798 0.442
##     F2014 F2015 F2016 F2017 F2018 F2019 F2020 Temperature_2021 Temperature_2022
## 22  0.940 1.111 1.025 1.160 1.056 1.147 1.031            1.522            0.884
## 73  1.188 1.200 1.635 1.741 1.028 1.349 1.770            1.675            1.323
## 164 1.541 1.971 1.515 1.893 2.004 1.840 1.734            2.165            1.855
## 64  0.781 1.235 1.216 0.688 1.064 1.623 0.770            0.669            1.371
## 225 0.025 0.970 1.270 0.088 0.453 0.925 0.389           -0.125           -0.490
## 222 1.053 1.412 1.660 1.429 1.290 1.444 1.711            1.447            1.394
## 122 0.787 1.017 1.089 1.347 1.040 1.089 1.010            1.687            0.887
## 123 1.507 1.403 1.748 1.224 1.441 1.290 1.643            2.123            1.955
## 217 0.865 1.094 1.098 0.726 0.843 1.235 1.350            0.734            0.533
## 125 0.674 0.892 1.034 0.800 0.540 0.752 1.092            0.716            0.684
## 197 0.935 1.102 0.995 1.450 1.055 1.399 1.091            1.126            0.911
## 137 0.716 1.034 1.262 0.837 0.810 1.209 1.026            0.687            0.834
## 96  1.515 0.441 1.118 1.367 0.881 1.175 1.199            1.020            1.840
## 38  0.697 0.983 1.222 1.224 1.145 1.264 1.140            1.268            1.032
## 9   0.951 0.957 0.488 1.095 0.878 0.760 1.123            1.031            0.643
##     F2022_Fahrenheit F2022_x_2
## 22           33.5912     1.768
## 73           34.3814     2.646
## 164          35.3390     3.710
## 64           34.4678     2.742
## 225          31.1180    -0.980
## 222          34.5092     2.788
## 122          33.5966     1.774
## 123          35.5190     3.910
## 217          32.9594     1.066
## 125          33.2312     1.368
## 197          33.6398     1.822
```

```
## 137          33.5012     1.668
## 96           35.3120     3.680
## 38           33.8576     2.064
## 9            33.1574     1.286
```

Summary Statistics and Statistical Functions

Summary Statistics

```
print(summary(df))
```

```
##     ObjectId       Country              ISO2              ISO3
##  Min.   :  1.0   Length:157         Length:157         Length:157
##  1st Qu.: 58.0   Class :character   Class :character   Class :character
##  Median :106.0   Mode  :character   Mode  :character   Mode  :character
##  Mean   :111.4
##  3rd Qu.:164.0
##  Max.   :225.0
##    Indicator             Unit              Source            CTS_Code
##  Length:157         Length:157         Length:157         Length:157
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##    CTS_Name         CTS_Full_Descriptor     F1961              F1962
##  Length:157         Length:157          Min.   :-0.6940   Min.   :-0.90800
##  Class :character   Class :character    1st Qu.:-0.0890   1st Qu.:-0.18300
##  Mode  :character   Mode  :character    Median : 0.0720   Median :-0.07000
##                                         Mean   : 0.1912   Mean   :-0.01311
##                                         3rd Qu.: 0.3580   3rd Qu.: 0.14000
##                                         Max.   : 1.8920   Max.   : 0.99800
##      F1963              F1964              F1965             F1966
##  Min.   :-1.27000   Min.   :-0.87700   Min.   :-1.0640   Min.   :-1.8010
##  1st Qu.:-0.21100   1st Qu.:-0.25700   1st Qu.:-0.3880   1st Qu.:-0.0440
##  Median :-0.03800   Median :-0.05200   Median :-0.2230   Median : 0.1170
##  Mean   :-0.01506   Mean   :-0.07865   Mean   :-0.2391   Mean   : 0.1309
##  3rd Qu.: 0.23400   3rd Qu.: 0.13100   3rd Qu.:-0.0780   3rd Qu.: 0.3080
##  Max.   : 1.20200   Max.   : 1.09700   Max.   : 0.8570   Max.   : 1.1510
##      F1967              F1968              F1969             F1970
##  Min.   :-1.0480   Min.   :-1.6340   Min.   :-0.9000   Min.   :-1.28800
##  1st Qu.:-0.2710   1st Qu.:-0.3460   1st Qu.:-0.0650   1st Qu.:-0.09600
##  Median :-0.1290   Median :-0.1730   Median : 0.1970   Median : 0.12800
##  Mean   :-0.1027   Mean   :-0.2014   Mean   : 0.1499   Mean   : 0.07806
##  3rd Qu.: 0.0320   3rd Qu.:-0.0670   3rd Qu.: 0.3820   3rd Qu.: 0.29900
##  Max.   : 1.1340   Max.   : 0.4760   Max.   : 0.8320   Max.   : 0.97800
##      F1971              F1972              F1973             F1974
##  Min.   :-0.8700   Min.   :-1.79600   Min.   :-0.9870   Min.   :-0.9820
##  1st Qu.:-0.3200   1st Qu.:-0.19900   1st Qu.:-0.0140   1st Qu.:-0.3620
##  Median :-0.1930   Median :-0.04300   Median : 0.2550   Median :-0.1980
##  Mean   :-0.1917   Mean   :-0.08836   Mean   : 0.2094   Mean   :-0.1637
##  3rd Qu.:-0.0550   3rd Qu.: 0.11900   3rd Qu.: 0.4460   3rd Qu.:-0.0480
```

```
##  Max.   : 0.6840   Max.   : 0.93300   Max.   : 1.1450   Max.   : 1.1210
##      F1975               F1976             F1977             F1978
##  Min.   :-1.093000   Min.   :-0.9590   Min.   :-0.5520   Min.   :-0.87100
##  1st Qu.:-0.274000   1st Qu.:-0.4360   1st Qu.: 0.0030   1st Qu.:-0.04300
##  Median :-0.128000   Median :-0.2950   Median : 0.1910   Median : 0.08600
##  Mean   :-0.008567   Mean   :-0.2568   Mean   : 0.1775   Mean   : 0.04388
##  3rd Qu.: 0.137000   3rd Qu.:-0.0850   3rd Qu.: 0.3410   3rd Qu.: 0.20500
##  Max.   : 1.893000   Max.   : 0.7290   Max.   : 1.0790   Max.   : 0.90800
##      F1979             F1980             F1981             F1982
##  Min.   :-1.2390   Min.   :-0.7600   Min.   :-0.9090   Min.   :-0.6820
##  1st Qu.: 0.0960   1st Qu.:-0.0200   1st Qu.: 0.0170   1st Qu.: 0.0000
##  Median : 0.2740   Median : 0.2820   Median : 0.1760   Median : 0.1800
##  Mean   : 0.2282   Mean   : 0.2201   Mean   : 0.1612   Mean   : 0.1674
##  3rd Qu.: 0.4590   3rd Qu.: 0.4320   3rd Qu.: 0.3730   3rd Qu.: 0.3790
##  Max.   : 1.2910   Max.   : 0.9700   Max.   : 1.5620   Max.   : 1.1350
##      F1983             F1984              F1985             F1986
##  Min.   :-2.0620   Min.   :-1.45500   Min.   :-1.19300   Min.   :-0.7650
##  1st Qu.: 0.1090   1st Qu.:-0.12600   1st Qu.:-0.06000   1st Qu.: 0.0150
##  Median : 0.4570   Median : 0.04000   Median : 0.11300   Median : 0.1760
##  Mean   : 0.3336   Mean   : 0.07001   Mean   : 0.06246   Mean   : 0.1538
##  3rd Qu.: 0.6770   3rd Qu.: 0.29400   3rd Qu.: 0.32400   3rd Qu.: 0.3380
##  Max.   : 1.6230   Max.   : 0.79900   Max.   : 0.89100   Max.   : 0.8350
##      F1987             F1988             F1989             F1990
##  Min.   :-1.6520   Min.   :-0.5040   Min.   :-1.5370   Min.   :-0.7390
##  1st Qu.: 0.1730   1st Qu.: 0.3380   1st Qu.:-0.0250   1st Qu.: 0.2740
##  Median : 0.4950   Median : 0.5010   Median : 0.1530   Median : 0.4800
##  Mean   : 0.3927   Mean   : 0.4979   Mean   : 0.2901   Mean   : 0.5932
##  3rd Qu.: 0.6920   3rd Qu.: 0.6810   3rd Qu.: 0.4790   3rd Qu.: 0.8290
##  Max.   : 1.5620   Max.   : 1.3360   Max.   : 2.1790   Max.   : 1.8430
##      F1991             F1992             F1993             F1994
##  Min.   :-0.7000   Min.   :-1.3440   Min.   :-1.3550   Min.   :-0.4250
##  1st Qu.: 0.1920   1st Qu.:-0.0610   1st Qu.: 0.0640   1st Qu.: 0.3050
##  Median : 0.3900   Median : 0.3050   Median : 0.2990   Median : 0.4990
##  Mean   : 0.3682   Mean   : 0.2231   Mean   : 0.2507   Mean   : 0.6148
##  3rd Qu.: 0.5380   3rd Qu.: 0.5330   3rd Qu.: 0.4870   3rd Qu.: 0.8650
##  Max.   : 1.1380   Max.   : 1.4520   Max.   : 1.0970   Max.   : 1.9580
##      F1995             F1996            F1997             F1998
##  Min.   :-0.3300   Min.   :-0.787   Min.   :-0.4220   Min.   :-0.258
##  1st Qu.: 0.3480   1st Qu.: 0.077   1st Qu.: 0.2920   1st Qu.: 0.841
##  Median : 0.5820   Median : 0.337   Median : 0.5580   Median : 1.018
##  Mean   : 0.5814   Mean   : 0.317   Mean   : 0.5492   Mean   : 1.007
##  3rd Qu.: 0.7940   3rd Qu.: 0.545   3rd Qu.: 0.8080   3rd Qu.: 1.200
##  Max.   : 1.7010   Max.   : 1.555   Max.   : 1.9330   Max.   : 2.470
##      F1999            F2000             F2001             F2002
##  Min.   :-0.232   Min.   :-0.7180   Min.   :-0.1860   Min.   :0.0090
##  1st Qu.: 0.483   1st Qu.: 0.2810   1st Qu.: 0.5160   1st Qu.:0.6810
##  Median : 0.642   Median : 0.5230   Median : 0.6910   Median :0.8270
##  Mean   : 0.761   Mean   : 0.6106   Mean   : 0.8095   Mean   :0.8783
##  3rd Qu.: 1.022   3rd Qu.: 0.8450   3rd Qu.: 1.1630   3rd Qu.:1.0340
##  Max.   : 2.064   Max.   : 2.0240   Max.   : 1.9920   Max.   :1.7860
##      F2003            F2004            F2005             F2006
##  Min.   :0.1450   Min.   :-0.133   Min.   :0.1030   Min.   :-0.5050
##  1st Qu.:0.7030   1st Qu.: 0.533   1st Qu.:0.6720   1st Qu.: 0.6740
##  Median :0.8790   Median : 0.701   Median :0.8410   Median : 0.8410
```

```
##  Mean   :0.9138   Mean   : 0.764   Mean   :0.8612   Mean   : 0.9116
##  3rd Qu.:1.0490   3rd Qu.: 0.969   3rd Qu.:1.0470   3rd Qu.: 1.1620
##  Max.   :2.3280   Max.   : 1.760   Max.   :2.2010   Max.   : 2.3430
##      F2007             F2008            F2009             F2010
##  Min.   :-0.2190   Min.   :0.0780   Min.   :-0.3190   Min.   :-0.341
##  1st Qu.: 0.6640   1st Qu.:0.4630   1st Qu.: 0.6900   1st Qu.: 0.766
##  Median : 0.8750   Median :0.6670   Median : 0.8920   Median : 1.111
##  Mean   : 0.9552   Mean   :0.7675   Mean   : 0.8991   Mean   : 1.108
##  3rd Qu.: 1.0900   3rd Qu.:1.0310   3rd Qu.: 1.1340   3rd Qu.: 1.311
##  Max.   : 2.7290   Max.   :2.1300   Max.   : 1.6950   Max.   : 3.058
##      F2011             F2012            F2013            F2014
##  Min.   :-0.0480   Min.   :0.1250   Min.   :0.1180   Min.   :-0.092
##  1st Qu.: 0.5380   1st Qu.:0.5880   1st Qu.:0.7150   1st Qu.: 0.777
##  Median : 0.7710   Median :0.7970   Median :0.8650   Median : 0.960
##  Mean   : 0.8256   Mean   :0.8684   Mean   :0.8899   Mean   : 1.090
##  3rd Qu.: 1.0710   3rd Qu.:1.0670   3rd Qu.:1.0980   3rd Qu.: 1.306
##  Max.   : 1.6980   Max.   :2.1440   Max.   :1.6420   Max.   : 2.704
##      F2015            F2016           F2017           F2018
##  Min.   :-0.430   Min.   :0.250   Min.   :0.017   Min.   :0.238
##  1st Qu.: 1.018   1st Qu.:1.129   1st Qu.:1.023   1st Qu.:0.850
##  Median : 1.192   Median :1.411   Median :1.252   Median :1.101
##  Mean   : 1.225   Mean   :1.403   Mean   :1.271   Mean   :1.237
##  3rd Qu.: 1.450   3rd Qu.:1.660   3rd Qu.:1.539   3rd Qu.:1.498
##  Max.   : 2.613   Max.   :2.381   Max.   :2.493   Max.   :2.524
##      F2019            F2020       Temperature_2021 Temperature_2022
##  Min.   :0.050   Min.   :0.229   Min.   :-0.425   Min.   :-1.305
##  1st Qu.:1.161   1st Qu.:1.160   1st Qu.: 1.019   1st Qu.: 0.875
##  Median :1.379   Median :1.434   Median : 1.327   Median : 1.280
##  Mean   :1.385   Mean   :1.483   Mean   : 1.361   Mean   : 1.334
##  3rd Qu.:1.616   3rd Qu.:1.734   3rd Qu.: 1.660   3rd Qu.: 1.745
##  Max.   :2.652   Max.   :3.317   Max.   : 2.676   Max.   : 3.243
##  F2022_Fahrenheit   F2022_x_2
##  Min.   :29.65    Min.   :-2.610
##  1st Qu.:33.58    1st Qu.: 1.750
##  Median :34.30    Median : 2.560
##  Mean   :34.40    Mean   : 2.668
##  3rd Qu.:35.14    3rd Qu.: 3.490
##  Max.   :37.84    Max.   : 6.486
```

Statistical Functions

```
#Mean of F2022
mean_F2022 <- mean(df$Temperature_2022) # nolint
print(paste("Mean of Temperature_2022:", mean_F2022))
```

```
## [1] "Mean of Temperature_2022: 1.33417197452229"
```

```
#Median of F2022
median_F2022 <- median(df$Temperature_2022) # nolint
print(paste("Median of Temperature_2022:", median_F2022))
```

```
## [1] "Median of Temperature_2022: 1.28"
```

```r
#Mode of F2022
get_mode <- function(v) {
  unique_val <- unique(v)
  unique_val[which.max(tabulate(match(v, unique_val)))]
}
mode_F2022 <- get_mode(df$Temperature_2022) # nolint
print(paste("Mode of Temperature_2022:", mode_F2022))
```

```
## [1] "Mode of Temperature_2022: 1.48"
```

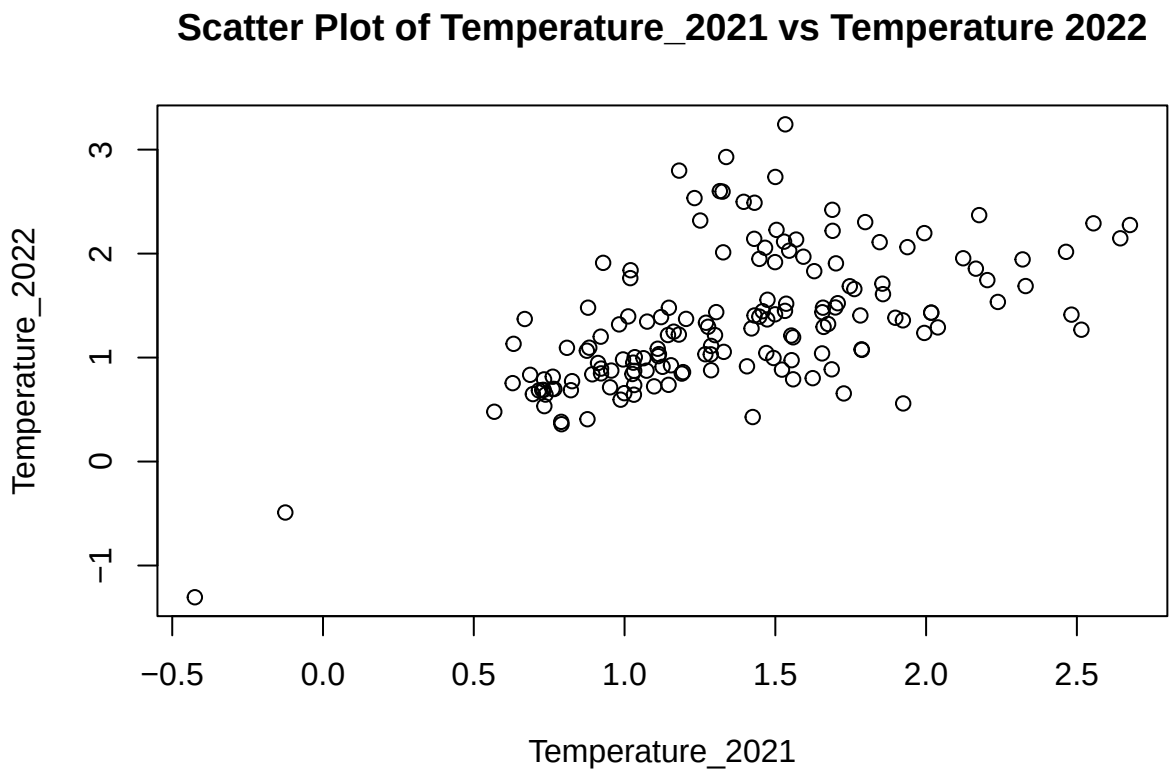
```r
#Range of F2022
range_F2022 <- range(df$Temperature_2022) # nolint
print(paste("Range of Temperature_2022:", range_F2022))
```

```
## [1] "Range of Temperature_2022: -1.305" "Range of Temperature_2022: 3.243"
```

Plots and Correlation

Scatter Plot

```r
plot(df$Temperature_2021, df$Temperature_2022,
     main = "Scatter Plot of Temperature_2021 vs Temperature 2022",
     xlab = "Temperature_2021", ylab = "Temperature_2022")
```



Bar Plot

```
library(ggplot2)
library(dplyr)
```

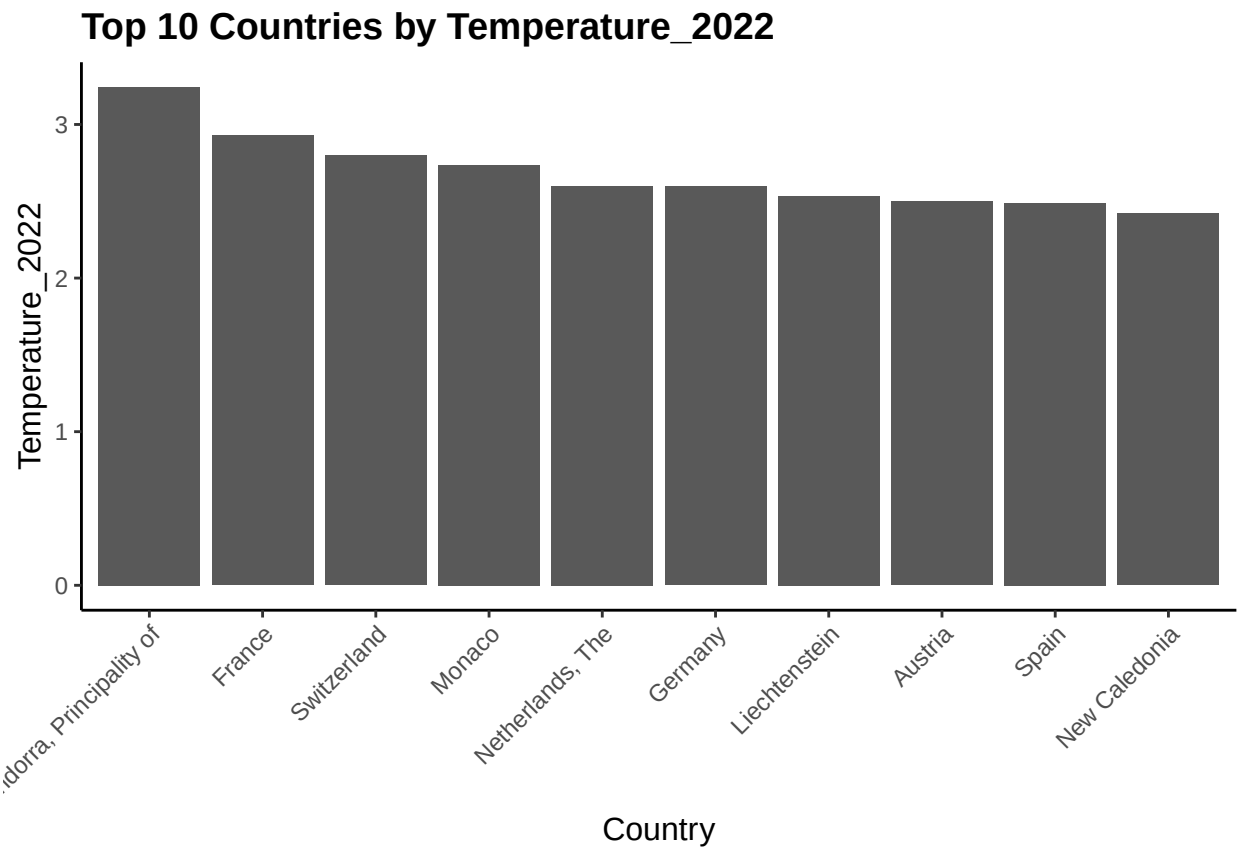
```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
# Getting the top 10 countries by Temperature_2022
top_10_countries <- df %>%
  arrange(desc(Temperature_2022)) %>%
  head(10)

# Creating the bar plot with only the top 10
ggplot(top_10_countries, aes(x = factor(Country, levels = Country),
                             y = Temperature_2022)) +
  geom_bar(stat = "identity") +
  labs(title = "Top 10 Countries by Temperature_2022",
       x = "Country",
       y = "Temperature_2022") +
  theme(axis.text.x = element_text(angle = 45, hjust = 1),
        plot.title = element_text(size = 14, face = "bold"),
        axis.title.x = element_text(size = 12),
        axis.title.y = element_text(size = 12),
        panel.background = element_blank(),
        axis.line = element_line(colour = "black"))
```



Correlation

```
correlation_F2021_F2022 <- cor(df$Temperature_2021, df$Temperature_2022) # nolint
print(paste("Correlation between Temperature_2021 and Temperature_2022:",
            correlation_F2021_F2022))
```

```
## [1] "Correlation between Temperature_2021 and Temperature_2022: 0.57464402453213"
```