The use case is to create the same plot in different languages. I used this technique for [Wikipedia](https://commons.wikimedia.org/wiki/File:Mauna_Loa_CO2_monthly_mean_concentration.svg) [plots](https://commons.wikimedia.org/wiki/File:Winter-NAO-Index.svg).

We are going to build a list containing all translations, we will then loop over each language, generating and saving the plot.

# Mauna Loa atmospheric CO2 change

# multi language plot for Wikipedia

# Required packages

library(tidyverse)

library(gridExtra)

library(scales)

library(lubridate)

# Translations ------------------------------------------------------------

language <- list(

en\_US = list(

locale\_lc\_time = "en\_US.UTF-8",

title = expression(paste("Monthly mean ", CO[2], " concentration ")),

caption = paste("Data : R. F. Keeling, S. J. Walker, S. C. Piper and A. F. Bollenbacher\nScripps CO2 Program (http://scrippsco2.ucsd.edu). Accessed ", Sys.Date()),

x = "Year",

y = expression(paste(CO[2], " fraction in dry air (", mu, "mol/mol)")),

x2 = "Month",

y2 = expression(atop(paste(CO[2], " fraction in dry air (", mu, "mol/mol)"), "Departure from yearly average")),

title2 = "Seasonal variation"

),

fr\_FR = list(

locale\_lc\_time = "fr\_FR.UTF-8",

title = expression(paste("Moyenne mensuelle de la concentration de ", CO[2])),

caption = paste("données : R. F. Keeling, S. J. Walker, S. C. Piper et A. F. Bollenbacher\nScripps CO2 Program (http://scrippsco2.ucsd.edu). Accédé le", Sys.Date()),

x = "année",

y = expression(paste("fraction de ", CO[2], " dans l'air sec (", mu, "mol/mol)")),

x2 = "mois",

y2 = expression(atop(paste("fraction de ", CO[2], " dans l'air sec (", mu, "mol/mol)"), "en écart à la moyenne annuelle")),

title2 = "Variation saisonnière"

),

de\_DE = list(

locale\_lc\_time = "de\_DE.UTF-8",

title = expression(paste("Monatliche durchschnittliche ", CO[2], "-Konzentration")),

caption = paste("Datei : R. F. Keeling, S. J. Walker, S. C. Piper und A. F. Bollenbacher\nScripps CO2 Program (http://scrippsco2.ucsd.edu). Zugänglich am", Sys.Date()),

x = "Jahr",

y = expression(paste(CO[2], "-Anteil in trockener Luft (", mu, "mol/mol)")),

x2 = "Monate",

y2 = expression(atop(paste(CO[2], "-Anteil in trockener Luft (", mu, "mol/mol)"), "Abweichung vom Jahresmittel")),

title2 = "Monatliche Variation"

),

es\_ES = list(

locale\_lc\_time = "es\_ES.UTF-8",

title = expression(paste("Media mensual de la concentración de ", CO[2])),

caption = paste("dato : R. F. Keeling, S. J. Walker, S. C. Piper y A. F. Bollenbacher\nScripps CO2 Program (http://scrippsco2.ucsd.edu). Visitada", Sys.Date()),

x = "Año",

y = expression(paste("Fraccion de ", CO[2], " en aire secco (", mu, "mol/mol)")),

x2 = "Mes",

y2 = expression(atop(paste("Fraccion de ", CO[2], " en aire secco (", mu, "mol/mol)"), "Desviación de la media anual")),

title2 = "Variación mensual"

),

cs\_CZ = list(

locale\_lc\_time = "cs\_CZ.UTF-8",

title = expression(paste("Průměrné měsíční koncentrace oxidu uhličitého")),

caption = paste("data : R. F. Keeling, S. J. Walker, S. C. Piper a A. F. Bollenbacher\nScripps CO2 Program (http://scrippsco2.ucsd.edu). Přístupné", Sys.Date()),

x = "rok",

y = expression(paste("koncentrace ", CO[2], " v suchém vzduchu (", mu, "mol/mol)")),

x2 = "měsíc",

y2 = expression(atop(paste("koncentrace ", CO[2], " v suchém vzduchu (", mu, "mol/mol)"), "odchylka od ročního průměru")),

title2 = "Měsíční změna (průměrná roční odchylka)"

),

nn\_NO = list(

locale\_lc\_time = "nn\_NO.UTF-8",

title = expression(paste("Gjennomsnittlig månedlig ", CO[2], "-konsentrasjon")),

caption = paste("data : R. F. Keeling, S. J. Walker, S. C. Piper og A. F. Bollenbacher\nScripps CO2 Program (http://scrippsco2.ucsd.edu). Vist", Sys.Date()),

x = "År",

y = expression(paste(CO[2],"-andel i tørr luft (", mu, "mol/mol)")),

x2 = "Måned",

y2 = expression(atop(paste(CO[2],"-andel i tørr luft (", mu, "mol/mol)"),

"Avvik fra årlig gjennomsnitt")),

title2 = "Årlig variasjon"

)

)

# Data --------------------------------------------------------------------

# http://scrippsco2.ucsd.edu/data/atmospheric\_co2/primary\_mlo\_co2\_record

# used during US gov shutdown

co2ml <- read\_csv("http://scrippsco2.ucsd.edu/assets/data/atmospheric/stations/in\_situ\_co2/monthly/monthly\_in\_situ\_co2\_mlo.csv",

col\_names = c("year", "month", "xls\_date", "decimal",

"co2", "co2\_seas\_adj", "fit", "fit\_seas\_adj",

"co2\_filled", "co2\_filled\_seas\_adj"),

col\_types = "iiiddddddd",

skip = 57,

na = "-99.99",

comment = "\"") %>%

group\_by(year) %>%

mutate(year\_mean = mean(co2\_filled, na.rm = TRUE),

delta = co2\_filled - year\_mean,

vdate = ymd(paste0("2015-", month, "-01")))

# Generate the plot for each language -------------------------------------

for (l in names(language)) {

message(l)

current <- language[[l]]

# format the date in local names

Sys.setlocale("LC\_TIME", current$locale\_lc\_time)

# main plot

p1 <- ggplot(co2ml, aes(decimal, co2\_filled)) +

geom\_line(color = "pink") +

geom\_point(color = "red", size = 0.6) +

stat\_smooth(span = 0.1) +

scale\_x\_continuous(breaks = pretty\_breaks()) +

scale\_y\_continuous(breaks = pretty\_breaks(4), minor\_breaks = pretty\_breaks(8)) +

labs(

x = current$x,

y = current$y,

title = current$title,

subtitle = paste("Mauna Loa", min(co2ml$year), "-", max(co2ml$year)),

caption = current$caption) +

theme\_bw() +

theme(plot.caption = element\_text(size = 7))

# inset plot

p2 <- ggplot(co2ml, aes(vdate, delta)) +

geom\_hline(yintercept = 0) +

stat\_smooth(span = 0.4, se = FALSE) +

stat\_summary(fun.data = "mean\_cl\_boot", colour = "red", size = 0.3) +

scale\_x\_date(breaks = pretty\_breaks(4), minor\_breaks = pretty\_breaks(12), labels = date\_format("%b")) +

labs(

x = current$x2,

y = current$y2,

title = current$title2) +

theme\_bw()

# merge the plots and export in SVG

p1 + annotation\_custom(grob = ggplotGrob(p2), xmin = 1957, xmax = 1991, ymin = 361, ymax = 412)

ggsave(file = paste("co2\_mauna\_loa", l, Sys.Date(), "wp.svg", sep = "\_"), width = 20, height = 20, units = "cm", device = svg)

}