#CLASSIFICATION FINALE : RE-APPRENDRE SUR GRAND X POUR TOUTES LES CLASSIFICATIONS :

Membres: Hadjoudja Bachir (21811363), Zeggar Rym (21909615), Bendahmane Rania (21811387), Labiad Youcef (21710780).

```python
#les imports utilisés
import sys
from numpy import vstack
import pandas as pd
from pandas import read_csv
from sklearn.preprocessing import LabelEncoder
from sklearn.metrics import accuracy_score
from torch.utils.data import Dataset
from torch.utils.data import DataLoader
from torch.utils.data import random_split
from torch import Tensor
from torch.nn import Linear
from torch.nn import ReLU
from torch.nn import Sigmoid
from torch.nn import Module
from torch.optim import SGD
from torch.nn import BCELoss
from torch.nn.init import kaiming_uniform_
from torch.nn.init import xavier_uniform_
import re
from nltk.corpus import stopwords
from nltk.stem.porter import PorterStemmer
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.model_selection import train_test_split
from sklearn.model_selection import cross_val_score
import pickle
import string
import nltk
from nltk.stem import WordNetLemmatizer
from nltk.stem import PorterStemmer
from nltk.corpus import stopwords
from nltk import word_tokenize
from sklearn.pipeline import Pipeline
from sklearn.naive_bayes import GaussianNB
from sklearn.metrics import accuracy_score
from sklearn.model_selection import KFold
from sklearn.metrics import confusion_matrix
from sklearn.metrics import classification_report
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.metrics import precision_recall_fscore_support as score
from sklearn.linear_model import LogisticRegression
from sklearn.tree import DecisionTreeClassifier
from sklearn.neighbors import KNeighborsClassifier
```

```python
from sklearn.svm import SVC
from sklearn.model_selection import GridSearchCV
from sklearn.ensemble import RandomForestClassifier
from sklearn.datasets import fetch_20newsgroups
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.metrics import accuracy_score
from sklearn.naive_bayes import MultinomialNB
from tabulate import tabulate
import numpy as np
import spacy
import time
from sklearn.metrics._plot.confusion_matrix import ConfusionMatrixDisplay

from spacy import displacy

import spacy
```

autorisation

```python
from google.colab import drive
drive.mount('/content/gdrive/')
```

Drive already mounted at /content/gdrive/; to attempt to forcibly remount, call drive.mount("/content/gdrive/", force_remount=True).

chemin spécifique Google Drive

```python
my_local_drive='/content/gdrive/My Drive/Colab Notebooks'
# Ajout du path pour les librairies, fonctions et données
sys.path.append(my_local_drive)
# Se positionner sur le répertoire associé
%cd $my_local_drive
%ls
```

```python
%pwd
```

```
/content/gdrive/My Drive/Colab Notebooks
 avecscaler.pkl
'BON_TRUE FALSE_TOPIC_MODELING.ipynb'
'BON_TRUE FALSE_vs_OTHER.ipynb'
'BON_TRUE FALSE_vs_OTHER_TOPIC_MODELING.ipynb'
 BON_TRUE_vs_FALSE_vs_OTHER_vs_MIXTURE_TOPIC_MODELING.ipynb
 Classification_de_données_textuelles2023.ipynb
 Dataset/
 firstmodel.pkl
'Ingénierie_des_données_textuelles2023 (1).ipynb'
 Ingénierie_des_données_textuelles2023.ipynb
 MyNLPUtilities.py
 newsTrain2.csv
 newsTrain_-_newsTrain.csv
 penguins.csv
```

```
 penguins.csv.1
 pkl_modelNB.sav
 Premières_Classifications.ipynb
'Projet ML FakeNEWS_TRUE FALSE_TEXT.ipynb'
'Projet ML FakeNEWS_TRUE FALSE_TEXT+TITRE.ipynb'
'Projet ML FakeNEWS_TRUE FALSE_TITRE.ipynb'
 __pycache__/
 ReviewsLabelled.csv
 ReviewsLabelled.csv.1
 ReviewsLabelled.csv.2
 ReviewsLabelled.csv.3
 ReviewsLabelled.csv.4
 ReviewsLabelled.csv.5
 SentimentModel.pkl
 StopWordsFrench.csv
 StopWordsFrench.csv.1
 StopWordsFrench.csv.2
 StopWordsFrench.csv.3
 StopWordsFrench.csv.4
 Topics_extraction.ipynb
 TP1_HAI817I.ipynb
 TP2_HAI817I.ipynb
 TRUE_vs_FALSE_vs_OTHER_vs_MIXTURE_TOPIC_MODELING.ipynb
 TRUE_vs_FALSE_vs_OTHER_vs_MIXTURE_TOPIC_MODELLING.ipynb
 Visualisation_Donnees_2D_3D.ipynb
```

`{"type":"string"}`

Installation des librairies importantes pour la visualisation

```
!pip install umap-learn[plot]
!pip install holoviews
!pip install -U ipykernel
```

```
Looking in indexes: https://pypi.org/simple, https://us-
python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: umap-learn[plot] in
/usr/local/lib/python3.10/dist-packages (0.5.3)
Requirement already satisfied: tqdm in /usr/local/lib/python3.10/dist-
packages (from umap-learn[plot]) (4.65.0)
Requirement already satisfied: numba>=0.49 in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(0.56.4)
Requirement already satisfied: scipy>=1.0 in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(1.10.1)
Requirement already satisfied: pynndescent>=0.5 in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(0.5.10)
Requirement already satisfied: numpy>=1.17 in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
```

```
(1.22.4)
Requirement already satisfied: scikit-learn>=0.22 in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(1.2.2)
Requirement already satisfied: matplotlib in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(3.7.1)
Requirement already satisfied: pandas in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(1.5.3)
Requirement already satisfied: holoviews in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(1.15.4)
Requirement already satisfied: seaborn in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(0.12.2)
Requirement already satisfied: colorcet in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(3.0.1)
Requirement already satisfied: scikit-image in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(0.19.3)
Requirement already satisfied: bokeh in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(2.4.3)
Requirement already satisfied: datashader in
/usr/local/lib/python3.10/dist-packages (from umap-learn[plot])
(0.14.4)
Requirement already satisfied: setuptools in
/usr/local/lib/python3.10/dist-packages (from numba>=0.49->umap-
learn[plot]) (67.7.2)
Requirement already satisfied: llvmlite<0.40,>=0.39.0dev0 in
/usr/local/lib/python3.10/dist-packages (from numba>=0.49->umap-
learn[plot]) (0.39.1)
Requirement already satisfied: joblib>=0.11 in
/usr/local/lib/python3.10/dist-packages (from pynndescent>=0.5->umap-
learn[plot]) (1.2.0)
Requirement already satisfied: threadpoolctl>=2.0.0 in
/usr/local/lib/python3.10/dist-packages (from scikit-learn>=0.22-
>umap-learn[plot]) (3.1.0)
Requirement already satisfied: Jinja2>=2.9 in
/usr/local/lib/python3.10/dist-packages (from bokeh->umap-learn[plot])
(3.1.2)
Requirement already satisfied: tornado>=5.1 in
/usr/local/lib/python3.10/dist-packages (from bokeh->umap-learn[plot])
(6.2)
Requirement already satisfied: packaging>=16.8 in
/usr/local/lib/python3.10/dist-packages (from bokeh->umap-learn[plot])
(23.1)
Requirement already satisfied: PyYAML>=3.10 in
```

/usr/local/lib/python3.10/dist-packages (from bokeh->umap-learn[plot])
(6.0)
Requirement already satisfied: typing-extensions>=3.10.0 in
/usr/local/lib/python3.10/dist-packages (from bokeh->umap-learn[plot])
(4.5.0)
Requirement already satisfied: pillow>=7.1.0 in
/usr/local/lib/python3.10/dist-packages (from bokeh->umap-learn[plot])
(8.4.0)
Requirement already satisfied: pyct>=0.4.4 in
/usr/local/lib/python3.10/dist-packages (from colorcet->umap-
learn[plot]) (0.5.0)
Requirement already satisfied: xarray in
/usr/local/lib/python3.10/dist-packages (from datashader->umap-
learn[plot]) (2022.12.0)
Requirement already satisfied: toolz in
/usr/local/lib/python3.10/dist-packages (from datashader->umap-
learn[plot]) (0.12.0)
Requirement already satisfied: param in
/usr/local/lib/python3.10/dist-packages (from datashader->umap-
learn[plot]) (1.13.0)
Requirement already satisfied: datashape in
/usr/local/lib/python3.10/dist-packages (from datashader->umap-
learn[plot]) (0.5.2)
Requirement already satisfied: requests in
/usr/local/lib/python3.10/dist-packages (from datashader->umap-
learn[plot]) (2.27.1)
Requirement already satisfied: dask in /usr/local/lib/python3.10/dist-
packages (from datashader->umap-learn[plot]) (2022.12.1)
Requirement already satisfied: panel>=0.13.1 in
/usr/local/lib/python3.10/dist-packages (from holoviews->umap-
learn[plot]) (0.14.4)
Requirement already satisfied: pyviz-comms>=0.7.4 in
/usr/local/lib/python3.10/dist-packages (from holoviews->umap-
learn[plot]) (2.2.1)
Requirement already satisfied: pytz>=2020.1 in
/usr/local/lib/python3.10/dist-packages (from pandas->umap-
learn[plot]) (2022.7.1)
Requirement already satisfied: python-dateutil>=2.8.1 in
/usr/local/lib/python3.10/dist-packages (from pandas->umap-
learn[plot]) (2.8.2)
Requirement already satisfied: cycler>=0.10 in
/usr/local/lib/python3.10/dist-packages (from matplotlib->umap-
learn[plot]) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in
/usr/local/lib/python3.10/dist-packages (from matplotlib->umap-
learn[plot]) (4.39.3)
Requirement already satisfied: kiwisolver>=1.0.1 in
/usr/local/lib/python3.10/dist-packages (from matplotlib->umap-
learn[plot]) (1.4.4)
Requirement already satisfied: contourpy>=1.0.1 in

/usr/local/lib/python3.10/dist-packages (from matplotlib->umap-learn[plot]) (1.0.7)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->umap-learn[plot]) (3.0.9)
Requirement already satisfied: networkx>=2.2 in /usr/local/lib/python3.10/dist-packages (from scikit-image->umap-learn[plot]) (3.1)
Requirement already satisfied: tifffile>=2019.7.26 in /usr/local/lib/python3.10/dist-packages (from scikit-image->umap-learn[plot]) (2023.4.12)
Requirement already satisfied: imageio>=2.4.1 in /usr/local/lib/python3.10/dist-packages (from scikit-image->umap-learn[plot]) (2.25.1)
Requirement already satisfied: PyWavelets>=1.1.1 in /usr/local/lib/python3.10/dist-packages (from scikit-image->umap-learn[plot]) (1.4.1)
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.10/dist-packages (from Jinja2>=2.9->bokeh->umap-learn[plot]) (2.1.2)
Requirement already satisfied: bleach in /usr/local/lib/python3.10/dist-packages (from panel>=0.13.1->holoviews->umap-learn[plot]) (6.0.0)
Requirement already satisfied: markdown in /usr/local/lib/python3.10/dist-packages (from panel>=0.13.1->holoviews->umap-learn[plot]) (3.4.3)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.8.1->pandas->umap-learn[plot]) (1.16.0)
Requirement already satisfied: partd>=0.3.10 in /usr/local/lib/python3.10/dist-packages (from dask->datashader->umap-learn[plot]) (1.4.0)
Requirement already satisfied: click>=7.0 in /usr/local/lib/python3.10/dist-packages (from dask->datashader->umap-learn[plot]) (8.1.3)
Requirement already satisfied: fsspec>=0.6.0 in /usr/local/lib/python3.10/dist-packages (from dask->datashader->umap-learn[plot]) (2023.4.0)
Requirement already satisfied: cloudpickle>=1.1.1 in /usr/local/lib/python3.10/dist-packages (from dask->datashader->umap-learn[plot]) (2.2.1)
Requirement already satisfied: multipledispatch>=0.4.7 in /usr/local/lib/python3.10/dist-packages (from datashape->datashader->umap-learn[plot]) (0.6.0)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests->datashader->umap-learn[plot]) (1.26.15)
Requirement already satisfied: charset-normalizer~=2.0.0 in /usr/local/lib/python3.10/dist-packages (from requests->datashader->umap-learn[plot]) (2.0.12)

Requirement already satisfied: idna<4,>=2.5 in
/usr/local/lib/python3.10/dist-packages (from requests->datashader-
>umap-learn[plot]) (3.4)
Requirement already satisfied: certifi>=2017.4.17 in
/usr/local/lib/python3.10/dist-packages (from requests->datashader-
>umap-learn[plot]) (2022.12.7)
Requirement already satisfied: locket in
/usr/local/lib/python3.10/dist-packages (from partd>=0.3.10->dask-
>datashader->umap-learn[plot]) (1.0.0)
Requirement already satisfied: webencodings in
/usr/local/lib/python3.10/dist-packages (from bleach->panel>=0.13.1-
>holoviews->umap-learn[plot]) (0.5.1)
Looking in indexes: https://pypi.org/simple, https://us-
python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: holoviews in
/usr/local/lib/python3.10/dist-packages (1.15.4)
Requirement already satisfied: param<2.0,>=1.9.3 in
/usr/local/lib/python3.10/dist-packages (from holoviews) (1.13.0)
Requirement already satisfied: pyviz-comms>=0.7.4 in
/usr/local/lib/python3.10/dist-packages (from holoviews) (2.2.1)
Requirement already satisfied: pandas>=0.20.0 in
/usr/local/lib/python3.10/dist-packages (from holoviews) (1.5.3)
Requirement already satisfied: colorcet in
/usr/local/lib/python3.10/dist-packages (from holoviews) (3.0.1)
Requirement already satisfied: panel>=0.13.1 in
/usr/local/lib/python3.10/dist-packages (from holoviews) (0.14.4)
Requirement already satisfied: packaging in
/usr/local/lib/python3.10/dist-packages (from holoviews) (23.1)
Requirement already satisfied: numpy>=1.0 in
/usr/local/lib/python3.10/dist-packages (from holoviews) (1.22.4)
Requirement already satisfied: pytz>=2020.1 in
/usr/local/lib/python3.10/dist-packages (from pandas>=0.20.0-
>holoviews) (2022.7.1)
Requirement already satisfied: python-dateutil>=2.8.1 in
/usr/local/lib/python3.10/dist-packages (from pandas>=0.20.0-
>holoviews) (2.8.2)
Requirement already satisfied: bleach in
/usr/local/lib/python3.10/dist-packages (from panel>=0.13.1-
>holoviews) (6.0.0)
Requirement already satisfied: pyct>=0.4.4 in
/usr/local/lib/python3.10/dist-packages (from panel>=0.13.1-
>holoviews) (0.5.0)
Requirement already satisfied: markdown in
/usr/local/lib/python3.10/dist-packages (from panel>=0.13.1-
>holoviews) (3.4.3)
Requirement already satisfied: tqdm>=4.48.0 in
/usr/local/lib/python3.10/dist-packages (from panel>=0.13.1-
>holoviews) (4.65.0)
Requirement already satisfied: setuptools>=42 in
/usr/local/lib/python3.10/dist-packages (from panel>=0.13.1-

```
>holoviews) (67.7.2)
Requirement already satisfied: typing-extensions in
/usr/local/lib/python3.10/dist-packages (from panel>=0.13.1-
>holoviews) (4.5.0)
Requirement already satisfied: requests in
/usr/local/lib/python3.10/dist-packages (from panel>=0.13.1-
>holoviews) (2.27.1)
Requirement already satisfied: bokeh<2.5.0,>=2.4.0 in
/usr/local/lib/python3.10/dist-packages (from panel>=0.13.1-
>holoviews) (2.4.3)
Requirement already satisfied: PyYAML>=3.10 in
/usr/local/lib/python3.10/dist-packages (from bokeh<2.5.0,>=2.4.0-
>panel>=0.13.1->holoviews) (6.0)
Requirement already satisfied: tornado>=5.1 in
/usr/local/lib/python3.10/dist-packages (from bokeh<2.5.0,>=2.4.0-
>panel>=0.13.1->holoviews) (6.2)
Requirement already satisfied: pillow>=7.1.0 in
/usr/local/lib/python3.10/dist-packages (from bokeh<2.5.0,>=2.4.0-
>panel>=0.13.1->holoviews) (8.4.0)
Requirement already satisfied: Jinja2>=2.9 in
/usr/local/lib/python3.10/dist-packages (from bokeh<2.5.0,>=2.4.0-
>panel>=0.13.1->holoviews) (3.1.2)
Requirement already satisfied: six>=1.5 in
/usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.8.1-
>pandas>=0.20.0->holoviews) (1.16.0)
Requirement already satisfied: webencodings in
/usr/local/lib/python3.10/dist-packages (from bleach->panel>=0.13.1-
>holoviews) (0.5.1)
Requirement already satisfied: idna<4,>=2.5 in
/usr/local/lib/python3.10/dist-packages (from requests->panel>=0.13.1-
>holoviews) (3.4)
Requirement already satisfied: charset-normalizer~=2.0.0 in
/usr/local/lib/python3.10/dist-packages (from requests->panel>=0.13.1-
>holoviews) (2.0.12)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in
/usr/local/lib/python3.10/dist-packages (from requests->panel>=0.13.1-
>holoviews) (1.26.15)
Requirement already satisfied: certifi>=2017.4.17 in
/usr/local/lib/python3.10/dist-packages (from requests->panel>=0.13.1-
>holoviews) (2022.12.7)
Requirement already satisfied: MarkupSafe>=2.0 in
/usr/local/lib/python3.10/dist-packages (from Jinja2>=2.9-
>bokeh<2.5.0,>=2.4.0->panel>=0.13.1->holoviews) (2.1.2)
Looking in indexes: https://pypi.org/simple, https://us-
python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: ipykernel in
/usr/local/lib/python3.10/dist-packages (6.22.0)
Requirement already satisfied: tornado>=6.1 in
/usr/local/lib/python3.10/dist-packages (from ipykernel) (6.2)
Requirement already satisfied: traitlets>=5.4.0 in
```

```
/usr/local/lib/python3.10/dist-packages (from ipykernel) (5.7.1)
Requirement already satisfied: jupyter-client>=6.1.12 in
/usr/local/lib/python3.10/dist-packages (from ipykernel) (6.1.12)
Requirement already satisfied: debugpy>=1.6.5 in
/usr/local/lib/python3.10/dist-packages (from ipykernel) (1.6.6)
Requirement already satisfied: ipython>=7.23.1 in
/usr/local/lib/python3.10/dist-packages (from ipykernel) (7.34.0)
Requirement already satisfied: nest-asyncio in
/usr/local/lib/python3.10/dist-packages (from ipykernel) (1.5.6)
Requirement already satisfied: pyzmq>=20 in
/usr/local/lib/python3.10/dist-packages (from ipykernel) (23.2.1)
Requirement already satisfied: comm>=0.1.1 in
/usr/local/lib/python3.10/dist-packages (from ipykernel) (0.1.3)
Requirement already satisfied: matplotlib-inline>=0.1 in
/usr/local/lib/python3.10/dist-packages (from ipykernel) (0.1.6)
Requirement already satisfied: psutil in
/usr/local/lib/python3.10/dist-packages (from ipykernel) (5.9.5)
Requirement already satisfied: jupyter-core!=5.0.*,>=4.12 in
/usr/local/lib/python3.10/dist-packages (from ipykernel) (5.3.0)
Requirement already satisfied: packaging in
/usr/local/lib/python3.10/dist-packages (from ipykernel) (23.1)
Requirement already satisfied: pickleshare in
/usr/local/lib/python3.10/dist-packages (from ipython>=7.23.1-
>ipykernel) (0.7.5)
Requirement already satisfied: decorator in
/usr/local/lib/python3.10/dist-packages (from ipython>=7.23.1-
>ipykernel) (4.4.2)
Requirement already satisfied: pexpect>4.3 in
/usr/local/lib/python3.10/dist-packages (from ipython>=7.23.1-
>ipykernel) (4.8.0)
Requirement already satisfied: jedi>=0.16 in
/usr/local/lib/python3.10/dist-packages (from ipython>=7.23.1-
>ipykernel) (0.18.2)
Requirement already satisfied: prompt-toolkit!=3.0.0,!
=3.0.1,<3.1.0,>=2.0.0 in /usr/local/lib/python3.10/dist-packages (from
ipython>=7.23.1->ipykernel) (3.0.38)
Requirement already satisfied: pygments in
/usr/local/lib/python3.10/dist-packages (from ipython>=7.23.1-
>ipykernel) (2.14.0)
Requirement already satisfied: setuptools>=18.5 in
/usr/local/lib/python3.10/dist-packages (from ipython>=7.23.1-
>ipykernel) (67.7.2)
Requirement already satisfied: backcall in
/usr/local/lib/python3.10/dist-packages (from ipython>=7.23.1-
>ipykernel) (0.2.0)
Requirement already satisfied: python-dateutil>=2.1 in
/usr/local/lib/python3.10/dist-packages (from jupyter-client>=6.1.12-
>ipykernel) (2.8.2)
Requirement already satisfied: platformdirs>=2.5 in
/usr/local/lib/python3.10/dist-packages (from jupyter-core!
```

```
=5.0.*,>=4.12->ipykernel) (3.3.0)
Requirement already satisfied: parso<0.9.0,>=0.8.0 in
/usr/local/lib/python3.10/dist-packages (from jedi>=0.16-
>ipython>=7.23.1->ipykernel) (0.8.3)
Requirement already satisfied: ptyprocess>=0.5 in
/usr/local/lib/python3.10/dist-packages (from pexpect>4.3-
>ipython>=7.23.1->ipykernel) (0.7.0)
Requirement already satisfied: wcwidth in
/usr/local/lib/python3.10/dist-packages (from prompt-toolkit!=3.0.0,!
=3.0.1,<3.1.0,>=2.0.0->ipython>=7.23.1->ipykernel) (0.2.6)
Requirement already satisfied: six>=1.5 in
/usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.1-
>jupyter-client>=6.1.12->ipykernel) (1.16.0)
```

-La fonction qui sera utilisée pour les prétraitements: MyCleanText

- Mettre le texte en minuscule
- Se débarasser des stopwords
- Se débarasser des nombres
- Stemmatisation
- Lemmatisation ..

-La fonction MyshowAllScores prend le y_test et le y_predict, affiche l'accuracy et le classification report avec la matrice de confusion.

-La fonction add_entity_name qui rajoute les entités nommées à côté du mot si il en existe sinon elle garde le mot

```python
#..............................................Fonction
MyCleanText ...................................................
..................
# mettre en minuscule
#enlever les stopwords
#se debarasser des nombres
#stemmatisation
#lemmatisation
#...............................................................
...............................................................
...........


nltk.download('wordnet')
nltk.download('stopwords')
nltk.download('punkt')
#liste des stopwords en anglais
stop_words = set(stopwords.words('english'))

def MyCleanText(X,
                lowercase=False, #mettre en minuscule
                removestopwords=False, #supprimer les stopwords
```

```python
                      removedigit=False, #supprimer les nombres
                      getstemmer=False, #conserver la racine des termes
                      getlemmatisation=False #lemmatisation des termes
                      ):
    #conversion du texte d'entrée en chaîne de caractères
    sentence=str(X)
    #suppression des caractères spéciaux
    sentence = re.sub(r'[^\w\s]',' ', sentence)
    # suppression de tous les caractères uniques
    sentence = re.sub(r'\s+[a-zA-Z]\s+', ' ', sentence)
    # substitution des espaces multiples par un seul espace
    sentence = re.sub(r'\s+', ' ', sentence, flags=re.I)

    # decoupage en mots
    tokens = word_tokenize(sentence)
    if lowercase:
        tokens = [token.lower() for token in tokens]

    # suppression ponctuation
    table = str.maketrans('', '', string.punctuation)
    words = [token.translate(table) for token in tokens]

    # suppression des tokens non alphabetique ou numerique
    words = [word for word in words if word.isalnum()]

    # suppression des tokens numerique
    if removedigit:
        words = [word for word in words if not word.isdigit()]

    # suppression des stopwords
    if removestopwords:
        words = [word for word in words if not word in stop_words]

    # lemmatisation
    if getlemmatisation:
        lemmatizer=WordNetLemmatizer()
        words = [lemmatizer.lemmatize(word)for word in words]


    # racinisation
    if getstemmer:
        ps = PorterStemmer()
        words=[ps.stem(word) for word in words]

    sentence= ' '.join(words)

    return sentence
```

```python
def MyshowAllScores(y_test,y_pred):
    classes= np.unique(y_test)
    print("Accuracy : %0.3f"%(accuracy_score(y_test,y_pred)))
    print("Classification Report")
    print(classification_report(y_test,y_pred,digits=5))
    cnf_matrix = confusion_matrix(y_test,y_pred)
    disp=ConfusionMatrixDisplay(cnf_matrix,display_labels=classes)
    disp.plot()

def add_entity_name(text):
    if text is None or pd.isna(text):
        return ""

    doc = nlp(text)
    # Créer une liste pour stocker les nouveaux tokens
    nouveaux_tokens = []

    # Parcourir les tokens et ajouter des informations selon le type
d'entité
    for token in doc:
        if token.ent_type_:
            # Ajouter le nom de l'entité (type d'entité) à côté de
l'entité
            nouveaux_tokens.append(f"{token.text}
({token.ent_type_})")
        else:
            nouveaux_tokens.append(token.text)

    # Reconstruire le texte avec les informations ajoutées
    nouveau_texte = " ".join(nouveaux_tokens)
    return nouveau_texte
```

```
[nltk_data] Downloading package wordnet to /root/nltk_data...
[nltk_data]   Package wordnet is already up-to-date!
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
[nltk_data] Downloading package punkt to /root/nltk_data...
[nltk_data]   Package punkt is already up-to-date!
```

- La classe TextNormalizer qui contiendra la fonction MyCleanText.

- Fit_transform de mon corpus propre.

```
#..............................................................Etape 1 :
prétraitement du
texte .....................................................................
......................................
#..............................................................Class
TextNormalizer .............................................................
........................
```

```python
#fit_transform de mon corpus propre
#......................................................
......................................................
...........

from sklearn.base import BaseEstimator, TransformerMixin

class TextNormalizer(BaseEstimator, TransformerMixin):
    def __init__(self,
                 removestopwords=False, # suppression des stopwords
                 lowercase=False,# passage en minuscule
                 removedigit=False, # supprimer les nombres
                 getstemmer=False,# racinisation des termes
                 getlemmatisation=False # lemmatisation des termes
                 ):

        self.lowercase=lowercase
        self.getstemmer=getstemmer
        self.removestopwords=removestopwords
        self.getlemmatisation=getlemmatisation
        self.removedigit=removedigit

    def transform(self, X, **transform_params):
        # Nettoyage du texte
        X=X.copy() # pour conserver le fichier d'origine
        return [MyCleanText(text,lowercase=self.lowercase,
                            getstemmer=self.getstemmer,
                            removestopwords=self.removestopwords,
                            getlemmatisation=self.getlemmatisation,
                            removedigit=self.removedigit) for text in
X]

    def fit(self, X, y=None, **fit_params):
        return self

    def fit_transform(self, X, y=None, **fit_params):
        return self.fit(X).transform(X)

    def get_params(self, deep=True):
        return {
            'lowercase':self.lowercase,
            'getstemmer':self.getstemmer,
            'removestopwords':self.removestopwords,
            'getlemmatisation':self.getlemmatisation,
            'removedigit':self.removedigit
        }

    def set_params (self, **parameters):
        for parameter, value in parameters.items():
```

```
            setattr(self,parameter,value)
        return self
```

##Etape 1 : Préparer les données

- Load et preparer les données à partir des 2 fichiers csv

```python
dftrain1 = pd.read_csv("/content/gdrive/MyDrive/Colab
Notebooks/newsTrain2.csv", names=['id','text','title','rating'],
header=0,sep=',', encoding='utf8')
dftrain1.reset_index(drop = True, inplace = True)

dftrain2 = pd.read_csv("/content/gdrive/MyDrive/Colab
Notebooks/newsTrain_-_newsTrain.csv",
names=['id','text','title','rating'], header=0,sep=',',
encoding='utf8')
dftrain2.reset_index(drop = True, inplace = True)


# concaténer les deux dataframes en ajoutant les lignes du deuxième à
la fin du premier
dftrainbase = pd.concat([dftrain1, dftrain2], ignore_index=True)


print("Echantillon de mon dataset \n")
print(dftrainbase.sample(n=10))
print("\n")
print("Quelques informations importantes \n")
dftrainbase.info()
print("\n")
X_text=dftrainbase["text"]
X_title=dftrainbase["title"]


print("le texte est")
display(X_text)
print("\n")
print("le titre est")
display(X_title)
print("\n")
y=dftrainbase.iloc[0:,-1]
print("voici la dernière case de rating")
display(y)
print("\n")
print("la taille de X_text est",X_text.shape)
print("\n")
print("la taille de y_train est " ,y.shape)
print("\n")
y = y.str.lower()
print("Les valeurs de true et false sont:\n", y.value_counts())
```

Echantillon de mon dataset

```
          id                                            text  \
1163  4d40e3aa  YUKON DELTA NATIONAL WILDLIFE REFUGE, Alaska —...
106   23bff2ff  Rome, Italy — Italian law enforcement arrested...
2420  2478493a  In the Atlantic Ocean, Subtle Shifts Hint at D...
3     f14e8eb6  But things took a turn for the worse when riot...
445   77e8beff  A record number of people killed themselves in...
2314  7043de09  Theresa May's government is under pressure to ...
2132  b099e01c  The worst murderers should be given a chance t...
1230  d4903310  A chunk of floating ice that weighs more than ...
8     c1dc1ac6  In a show of anti-American sentiment that will...
1740  5daad203  TALLAHASSEE — As the Florida Legislature finis...

                                                  title   rating
1163                   Alaska's Permafrost Is Thawing     TRUE
106      Italy Arrests Cardinals And Seizes Vatican City   FALSE
2420  In the Atlantic Ocean, Subtle Shifts Hint at D...  mixture
3        Obama's Daughters Caught on Camera Burning US ...   FALSE
445      Surprise, Surprise — Literally one hour after ...    TRUE
2314  London fire: Theresa May's government accused ...  mixture
2132  Tapping private resources for public universit...   FALSE
1230  An Iceberg the Size of Delaware Just Broke Awa...    TRUE
8        Obama's Daughters Caught on Camera Burning US ...   FALSE
1740  One in four mothers-to-be have mental health i...  mixture
```

Quelques informations importantes

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2528 entries, 0 to 2527
Data columns (total 4 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   id      2528 non-null   object
 1   text    2528 non-null   object
 2   title   2482 non-null   object
 3   rating  2528 non-null   object
dtypes: object(4)
memory usage: 79.1+ KB
```

le texte est

```
0       Distracted driving causes more deaths in Canad...
1       Missouri politicians have made statements afte...
2       Home Alone 2: Lost in New York is full of viol...
3       But things took a turn for the worse when riot...
4       It's no secret that Epstein and Schiff share a...
                        ...
```

```
2523    More than four million calls to the taxman are...
2524    More under-18s are being taken to court for se...
2525    The Government's much vaunted Help to Buy Isa ...
2526    The late Robin Williams once called cocaine "G...
2527    The late Robin Williams once called cocaine "G...
Name: text, Length: 2528, dtype: object
```

le titre est

```
0       You Can Be Fined $1,500 If Your Passenger Is U...
1              Missouri lawmakers condemn Las Vegas shooting
2       CBC Cuts Donald Trump's 'Home Alone 2' Cameo O...
3       Obama's Daughters Caught on Camera Burning US ...
4       Leaked Visitor Logs Reveal Schiff's 78 Visits ...
                            ...
2523    Taxman fails to answer four million calls a ye...
2524    Police catch 11-year-olds being used to sell d...
2525    Help to Buy Isa scandal: 500,000 first-time bu...
2526              A coke-snorting generation of hypocrites
2527              A coke-snorting generation of hypocrites
Name: title, Length: 2528, dtype: object
```

voici la dernière case de rating

```
0          FALSE
1         mixture
2         mixture
3          FALSE
4          FALSE
          ...
2523        TRUE
2524        TRUE
2525       FALSE
2526        TRUE
2527        TRUE
Name: rating, Length: 2528, dtype: object
```

la taille de X_text est (2528,)

la taille de y_train est (2528,)

Les valeurs de true et false sont:

```
 false        1156
mixture       716
true          422
other         234
Name: rating, dtype: int64
```

Dans ce notebook , nous faisons en sorte de réapprendre sur le grand X pour chaque classification avec le meilleur classifieur et les meilleurs paramètres

Etape 2 : La première classification True vs False (sur la colonne Text) avec les entités nommées :

```
dftrain = dftrainbase
print(dftrain.shape)
print(dftrain)
X=dftrain.iloc[0:,1:3]
y=dftrain.iloc[0:,-1]
print("les valeurs sont " ,y.value_counts())

(2528, 4)
            id                                               text  \
0      5a228e0e  Distracted driving causes more deaths in Canad...
1      30c605a1  Missouri politicians have made statements afte...
2      c3dea290  Home Alone 2: Lost in New York is full of viol...
3      f14e8eb6  But things took a turn for the worse when riot...
4      faf024d6  It's no secret that Epstein and Schiff share a...
...         ...                                                ...
2523   47423bb6  More than four million calls to the taxman are...
2524   097c142a  More under-18s are being taken to court for se...
2525   08bc59f4  The Government's much vaunted Help to Buy Isa ...
2526   af3393ce  The late Robin Williams once called cocaine "G...
2527   a39d07df  The late Robin Williams once called cocaine "G...

                                                  title   rating
0      You Can Be Fined $1,500 If Your Passenger Is U...   FALSE
1          Missouri lawmakers condemn Las Vegas shooting  mixture
2      CBC Cuts Donald Trump's 'Home Alone 2' Cameo O...  mixture
3      Obama's Daughters Caught on Camera Burning US ...   FALSE
4      Leaked Visitor Logs Reveal Schiff's 78 Visits ...   FALSE
...                                                  ...      ...
2523   Taxman fails to answer four million calls a ye...    TRUE
2524   Police catch 11-year-olds being used to sell d...    TRUE
2525   Help to Buy Isa scandal: 500,000 first-time bu...   FALSE
2526            A coke-snorting generation of hypocrites    TRUE
2527            A coke-snorting generation of hypocrites    TRUE

[2528 rows x 4 columns]
les valeurs sont  FALSE        1156
mixture       716
TRUE          422
```

```
other       234
Name: rating, dtype: int64
```

Cette fonction, traite tous les documents de notre corpus, et stocke toutes les entités nommées dans une liste

```python
nlp = spacy.load("en_core_web_sm")
texte=dftrain['text']
#Créer une liste pour stocker les entités nommées
entities = []
# Traiter chaque texte individuellement et ajouter les entités à la
liste
for phrase in texte:
    phrase_str = str(phrase)   # Convertir l'élément en chaîne de
caractères
    doc = nlp(phrase_str)
    for ent in doc.ents:
        entities.append((ent.text, ent.label_))


# Afficher les entités nommées
for entity in entities:
    print(entity[0], entity[1])

Le flux de sortie a été tronqué et ne contient que les 5000 dernières
lignes.
2/27/1976 DATE
Chicago GPE
February 20, 2017 DATE
Ottumwa GPE
Iowa GPE
Wednesday DATE
79 degrees QUANTITY
monthly DATE
February DATE
Kansas City GPE
seven-day DATE
February DATE
Wednesday DATE
Monday DATE
Chicago GPE
70 degrees QUANTITY
fifth ORDINAL
February DATE
fourth ORDINAL
February DATE
Midwest LOC
the Great Lakes LOC
days DATE
Feb. 22 DATE
```

just 19.1 percent PERCENT
48 CARDINAL
this time of year DATE
Midwest LOC
Nebraska GPE
Wisconsin GPE
South LOC
East LOC
U.S. GPE
the past few weeks DATE
daily DATE
daily DATE
more than 4-to-1 CARDINAL
the past several decades DATE
U.S. GPE
3rd ORDINAL
January DATE
2016 DATE
about 1.7 degrees QUANTITY
Fahrenheit WORK_OF_ART
1880 DATE
about 1-to-1 CARDINAL
2009 DATE
2 CARDINAL
48 CARDINAL
the 2000s DATE
coming decades DATE
as high as 15 CARDINAL
One CARDINAL
Deke Arndt PERSON
NCEI ORG
a few years DATE
This week DATE
season DATE
USA GPE
months DATE
overnight TIME
70-degree QUANTITY
February days DATE
Washington GPE
D.C. GPE
Australia GPE
Great Barrier Reef FAC
World Heritage ORG
the Australian Research Council ORG
the Great Barrier Reef EVENT
the mid-2030s DATE
Coral Sea LOC
the Great Barrier Reef EVENT
the past century DATE

March 2016 DATE
Thursday DATE
March 2016 DATE
this year DATE
at least 175 CARDINAL
1 degree Celsius QUANTITY
1.8 degrees QUANTITY
Fahrenheit WORK_OF_ART
March DATE
the Great Barrier Reef FAC
2016 DATE
Catlin Seaview Survey PERSON
year DATE
every two years in the month of March DATE
the year 2034 DATE
the year DATE
2050 DATE
one CARDINAL
the 2030s DATE
the Great Barrier Reef EVENT
Andrew King PERSON
ARC ORG
one CARDINAL
the Great Barrier Reef EVENT
Australians NORP
1992 DATE
U.N. ORG
March 2016 DATE
2034 DATE
Geert Jan van Oldenborgh PERSON
Netherlands GPE
The Paris Agreement ORG
172 CARDINAL
April 22 DATE
American Samoa ORG
first ORDINAL
December 2014 DATE
second ORDINAL
February 2015 DATE
Catlin PERSON
El Niño ORG
third ORDINAL
2014 DATE
2017 DATE
the Coral Sea LOC
Heidi Cullen PERSON
Climate Central ORG
New Jersey GPE
Mashable PERSON
Cullen ORG

the Great Barrier Reef EVENT
the next few decades DATE
March 29 DATE
Australian NORP
the Great Barrier Reef EVENT
The Task Force ORG
10 CARDINAL
Australian NORP
more than 500 CARDINAL
Cairns PERSON
Papua New Guinea GPE
Terry Hughes PERSON
the National Coral Bleaching Taskforce ORG
Hughes ORG
4,000 kilometers QUANTITY
the Great Barrier Reef EVENT
only four CARDINAL
2002 DATE
1998 DATE
one CARDINAL
third ORDINAL
the warmest year DATE
2015 DATE
two CARDINAL
months DATE
Earth LOC
January DATE
February DATE
El Niño ORG
Pacific Ocean LOC
Republican NORP
E&E News ORG
Earth LOC
The White Cliffs of Dover ORG
Antarctic LOC
Republicans NORP
the U.S. House of Representatives Science, Space and Technology
Committee ORG
yesterday DATE
two hours TIME
Republicans NORP
Democrats NORP
Philip Duffy PERSON
the Woods Hole Research Center ORG
Massachusetts GPE
the U.S. Global Change Research Program ORG
Dana Rohrabacher PERSON
1 CARDINAL
Science Committee ORG
Lamar Smith PERSON

The Wall Street Journal ORG
yesterday DATE
thousands CARDINAL
Fred Singer PERSON
the Heartland Institute ORG
Chicago GPE
Illinois GPE
first ORDINAL
Smith PERSON
one CARDINAL
Smith ORG
two CARDINAL
Smith PERSON
Duffy ORG
San Francisco GPE
Smith ORG
recent decades DATE
Mo Brooks PERSON
four CARDINAL
100 years ago DATE
Duffy PERSON
Smith PERSON
Smith PERSON
San Francisco GPE
Duffy ORG
Mo Brooks PERSON
Duffy ORG
Brooks ORG
California GPE
the White Cliffs of Dover ORG
Mississippi LOC
Amazon ORG
Nile LOC
Brooks ORG
Duffy ORG
Brooks ORG
Antarctic LOC
a few years ago DATE
Arctic LOC
Antarctic LOC
Antarctic LOC
Duffy ORG
Brooks ORG
Duffy ORG
The National Snow and Ice Data Center WORK_OF_ART
the National Aeronautics and Space Administration ORG
NASA ORG
Brooks ORG
Antarctica LOC
Greenland GPE

Arctic LOC
Earlier this year DATE
NASA ORG
Antarctica LOC
the last decade DATE
last year DATE
Antarctica LOC
Bill Posey PERSON
the 1970s DATE
Earth LOC
Time ORG
Duffy ORG
Posey ORG
Duffy ORG
Arctic LOC
Duffy ORG
Posey PERSON
Earth LOC
Posey PERSON
today DATE
Duffy ORG
Posey PERSON
Duffy ORG
2 CARDINAL
3 degrees QUANTITY
tens of meters QUANTITY
Posey PERSON
Earth LOC
Correction ORG
5/17/2018 DATE
12:35 p.m. TIME
Wall Street Journal ORG
Greenwire PERSON
E&E News ORG
2018 DATE
E&E ORG
Arctic LOC
Greenland GPE
summer DATE
this year DATE
One CARDINAL
Arctic LOC
Greenland GPE
February DATE
earlier this month DATE
the 1970s DATE
Greenland GPE
Ruth Mottram PERSON
the Danish Meteorological Institute ORG
Greenland GPE

Arctic LOC
the last week DATE
Ice LOC
Greenland GPE
the Transpolar Drift Stream ORG
one CARDINAL
two CARDINAL
Siberia LOC
Arctic LOC
Walt Meier PERSON
the US National Snow and Ice Data Center ORG
four metres QUANTITY
20 metres QUANTITY
this past winter DATE
February and March DATE
Arctic LOC
about 1C (1.8F CARDINAL
the past century DATE
Arctic LOC
Alaskan NORP
Utqiaġvik GPE
Barrow LOC
5.5C CARDINAL
1979 DATE
the summer of 2019 DATE
Arctic LOC
Greenland GPE
40C CARDINAL
Arctic LOC
Antarctic LOC
about 13% PERCENT
1979 DATE
Nasa ORG
Arctic LOC
US GPE
2019 DATE
Arctic LOC
Arctic LOC
the 2040s DATE
Ice LOC
the past 15 years DATE
Arctic LOC
Arctic LOC
Arctic LOC
Scary WORK_OF_ART
Thomas Lavergne PERSON
the Norwegian Meteorological Institute ORG
hundreds of miles QUANTITY
Greenland GPE
North for Greenland GPE

— Thomas Lavergne PERSON
August 13, 2018 DATE
few days from now DATE
year DATE
two CARDINAL
February DATE
Morris Jesup PERSON
earlier this year DATE
10 days DATE
Arctic sea LOC
15 August 2018 DATE
5.7 CARDINAL
sq km PERSON
2.2m sq miles QUANTITY
1981 DATE
2010 DATE
that day DATE
Last week DATE
Morris Jesup PERSON
17C DATE
11 CARDINAL
Rasmus Tage Tonboe PERSON
the the Danish Meteorological Institute ORG
the Norwegian Ice Service ORG
Arctic LOC
this week DATE
40% PERCENT
this time of year DATE
1981 DATE
the past month DATE
at least 14 days DATE
the past month DATE
Arctic LOC
year DATE
the Arctic Ocean LOC
between 2030 DATE
2050 DATE
Keld Qvistgaard PERSON
Denmark GPE
first ORDINAL
one CARDINAL
1 to 5 August DATE
Kap GPE
Morris Jesup PERSON
Earth LOC
Arctic LOC
the beginning of the year DATE
the sunless winter DATE
the Gulf Stream LOC
1,600 years DATE

Greenland GPE
Lapland GPE
Siberia LOC
Scandinavia LOC
Arctic LOC
Polar NORP
Susan Crockford PERSON
Photo ORG
Sean Kilpatrick PERSON
The Canadian Press Article ORG
One CARDINAL
More than 15,000 CARDINAL
2005 DATE
summer DATE
2006 DATE
2050 DATE
67 CARDINAL
Canadian NORP
Ian Stirling PERSON
the 1970s DATE
Beaufort Sea LOC
more than a dozen CARDINAL
today DATE
these days DATE
Stirling GPE
the Beaufort Sea LOC
summer DATE
2014–16 CARDINAL
Advertisement Story PERSON
Article content LAW
One CARDINAL
2007 DATE
American NORP
Steven Amstrup PERSON
Polar Bears International ORG
summer DATE
the Beaufort Sea LOC
Amstrup PERSON
summer DATE
the Bering Strait LOC
summer DATE
summer DATE
Arctic LOC
spring DATE
summer DATE
the 1980s DATE
the spring DATE
Baffin Island LOC
July 2017 DATE
National Geographic ORG

late last year DATE
that year DATE
Advertisement Story PERSON
only hundreds CARDINAL
the International Union for Conservation of Nature ORG
2015 DATE
between 22,000-31,000 CARDINAL
about 26,000 CARDINAL
20,000-25,000 CARDINAL
about 22,500 CARDINAL
2005 DATE
2015 DATE
2,500 CARDINAL
67-per-cent QUANTITY
2007 DATE
Susan Crockford PERSON
the University of Victoria ORG
State ORG
the Polar Bear Report ORG
2017 DATE
Tuesday DATE
Grounds for Thought ORG
Toronto GPE
Logic PRODUCT
the Financial Post ORG
daily DATE
the Financial Post ORG
Postmedia Network Inc. ORG
Postmedia Network Inc. ORG
Postmedia Network Inc. ORG
Bloor Street East FAC
Toronto GPE
Ontario GPE
3L4 CARDINAL
416-383-2300 CARDINAL
Top Stories Newsletter ORG
CNN ORG
Monday DATE
the UN Intergovernmental Panel on Climate Change (IPCC ORG
1.5 degrees Celsius QUANTITY
2.7 degrees QUANTITY
Fahrenheit WORK_OF_ART
as early as 2030 DATE
hundreds of millions MONEY
today DATE
two-thirds CARDINAL
about 1 degree CARDINAL
the next few years DATE
1.5 degrees QUANTITY
Andrew King PERSON

the University of Melbourne ORG
45% PERCENT
2010 DATE
2030 DATE
zero CARDINAL
2050 DATE
around 1.5 degrees QUANTITY
1.5 degrees QUANTITY
the Paris Agreement LAW
NASA ORG
Operation IceBridge ORG
Greenland GPE
Arctic LOC
One CARDINAL
1 degree QUANTITY
Arctic LOC
Panmao Zhai PERSON
IPCC Working Group I.   ORG
just below 1.5 degrees QUANTITY
summer DATE
Europe LOC
this summer DATE
3 degrees QUANTITY
between 70 and 90% PERCENT
Australia GPE
Great Barrier Reef FAC
1.5 degrees QUANTITY
Hans-Otto Pörtner PERSON
Co-Chair of IPCC Working Group II ORG
1.5 degrees QUANTITY
2 degrees QUANTITY
10 cm QUANTITY
2100 DATE
Arctic Ocean LOC
summer DATE
70% to 90% PERCENT
IPCC ORG
Monday DATE
three years DATE
2015 DATE
Paris Climate Agreement EVENT
Paris GPE
197 CARDINAL
2 degrees QUANTITY
1.5 degrees QUANTITY
C. NORP
The United States GPE
Donald Trump PERSON
a year and half later DATE
1.5 degree QUANTITY

Jim Skea PERSON
IPCC Working Group III ORG
Sarah Perkins-Kirkpatrick PERSON
the Climate Change Research Center ORG
the University of New South Wales ORG
The next few years DATE
One CARDINAL
two CARDINAL
Trump ORG
Today the world's WORK_OF_ART
US GPE
Al Gore PERSON
Trump ORG
American NORP
Earth LOC
411 CARDINAL
May DATE
April DATE
the previous month DATE
410 ppm QUANTITY
first ORDINAL
the 800,000 years DATE
Earth LOC
the past 800,000 years DATE
Humans NORP
about 200,000 years ago DATE
more than 3 kilometers QUANTITY
Greenland GPE
Antarctica LOC
today DATE
first ORDINAL
monthly DATE
410 CARDINAL
million CARDINAL
April DATE
the Mauna Loa Observatory FAC
Hawaii GPE
May DATE
411 ppm QUANTITY
Scripps Institute of Oceanography ORG
the University of California San Diego ORG
the National Oceanic and Atmospheric Administration ORG
the past two centuries DATE
recent years DATE
tens of thousands CARDINAL
Katharine Hayhoe PERSON
Twitter PRODUCT
West Antarctica LOC
centuries DATE
NASA ORG

the 800,000 years DATE
between about 170 CARDINAL
280 ppm QUANTITY
300 ppm QUANTITY
first ORDINAL
400 ppm QUANTITY
2013 DATE
Pliocene PERSON
2 million CARDINAL
years ago DATE
60 to 80 feet QUANTITY
today DATE
Miocene PERSON
10 million CARDINAL
more than 100 feet QUANTITY
800,000-year DATE
about 1,000 years DATE
35 ppm QUANTITY
more than 2 CARDINAL
500 CARDINAL
the next 45 years DATE
tens of thousands CARDINAL
Environmental Protection Agency ORG
1959 DATE
2016 DATE
One 2008 DATE
an additional 22,000 CARDINAL
emphysema PERSON
Humans NORP
9 million CARDINAL
2015 DATE
16% PERCENT
Barack Obama PERSON
EPA ORG
2009 DATE
the Clean Air Act LAW
Trump PERSON
Pedestrians NORP
Nanjing GPE
China GPE
Thomson Reuters Drowning ORG
one CARDINAL
550 ppm QUANTITY
the end of the century DATE
6 degrees Celsius QUANTITY
0.9-degree QUANTITY
al. GPE
2013 DATE
Snyder NORP
al. GPE

2016 DATE
Bereiter PERSON
al. GPE
2015 DATE
Ben Henley PERSON
Nerilie Abram PERSON
Paris GPE
2 degrees QUANTITY
Nature WORK_OF_ART
more than 3 CARDINAL
June 12 DATE
May DATE
Ross McKitrick PERSON
Ross McKitrick PERSON
Photo PERSON
NOAA / AFP / Getty Images Article ORG
Ross McKitrick PERSON
This week DATE
Vancouver GPE
Trudeau PERSON
Canadians NORP
Canadians NORP
Ottawa GPE
Western Canada LOC
Ross McKitrick PERSON
Roger Pielke Jr. PERSON
University of Colorado ORG
Boulder GPE
a few years ago DATE
Pielke PERSON
White House ORG
Democratic NORP
2015 DATE
Advertisement Story PERSON
Advertisement Story PERSON
Article content In LAW
2012 DATE
the IPCC Special Report ORG
the Hohenkammer Consensus ORG
2013 DATE
Congress ORG
IPCC ORG
Obama PERSON
John Holdren PERSON
Congress ORG
Pielke GPE
Democrats NORP
Pielke GPE
2015 DATE
the second half DATE

Pielke NORP
2013 DATE
2018 DATE
U.S. National Climate Assessment EVENT
U.S. GPE
the past 50 years DATE
U.S. GPE
1965 DATE
U.S. GPE
1940 DATE
today DATE
less than 0.05 CARDINAL
about 0.2 per cent MONEY
Advertisement Story PERSON
U.S. GPE
2012 to 2017 DATE
U.S. GPE
Trudeau PERSON
Roger Pielke Jr. PERSON
Ross McKitrick PERSON
the University of Guelph ORG
the Fraser Institute ORG
Editor PERSON
Logic PRODUCT
the Financial Post ORG
daily DATE
the Financial Post ORG
Postmedia Network Inc. ORG
Postmedia Network Inc. ORG
Postmedia Network Inc. ORG
Bloor Street East FAC
Toronto GPE
Ontario GPE
3L4 CARDINAL
416-383-2300 CARDINAL
Top Stories Newsletter ORG
the Arctic Ocean LOC
East Siberian NORP
Guardian ORG
350 metres QUANTITY
the Laptev Sea LOC
Russia GPE
Arctic LOC
80 CARDINAL
20 years DATE
The United States ORG
Arctic LOC
one CARDINAL
four CARDINAL
Russian NORP

Akademik Keldysh PERSON
four to eight CARDINAL
East Siberian NORP
Swedish NORP
Örjan Gustafsson PERSON
Stockholm University ORG
Quick Guide Methane ORG
the Arctic Show LOC
1,400 CARDINAL
Arctic LOC
80 CARDINAL
20-year DATE
the United States GPE
Arctic LOC
one CARDINAL
four CARDINAL
Earth LOC
the Laptev Sea LOC
Arctic LOC
multi-year DATE
International Shelf Study Expedition EVENT
the early 1980s and 2015 DATE
Arctic LOC
zero CARDINAL
Arctic LOC
60 CARDINAL
Akademik Keldysh PERSON
first ORDINAL
about 600km QUANTITY
Electra 1 PRODUCT
Akademik Keldysh PERSON
six CARDINAL
150km QUANTITY
10km QUANTITY
one CARDINAL
Laptev Sea LOC
about 300 metres QUANTITY
up to 1,600 CARDINAL
400 CARDINAL
Igor Semiletov PERSON
the Russian Academy of Sciences ORG
Atlantic LOC
the east Arctic LOC
Atlantification PRODUCT
third ORDINAL
two decades DATE
Arctic LOC
the second year in a row DATE
the Laptev Sea LOC
East Siberian NORP

tens to hundreds CARDINAL
Siberian NORP
earlier this autumn DATE
Siberia LOC
5C CARDINAL
January to June this year DATE
anomaly GPE
at least 600 CARDINAL
Last winter's sea DATE
winter DATE
more than 75% PERCENT
US GPE
China GPE
European Union ORG
Australia GPE
just 18% PERCENT
37% PERCENT
83% PERCENT
60% PERCENT
86% PERCENT
Science ORG
almost 40,000 CARDINAL
119 CARDINAL
40 CARDINAL
90% PERCENT
Earth LOC
Joseph Poore PERSON
the University of Oxford ORG
UK GPE
12 CARDINAL
50 CARDINAL
six CARDINAL
36 CARDINAL
half CARDINAL
about two-thirds CARDINAL
570 CARDINAL
at least $ MONEY
every year DATE
Labels PERSON
One CARDINAL
two-thirds CARDINAL
Asia LOC
96% PERCENT
Europe LOC
Prof Gidon Eshel PERSON
Bard College ORG
US GPE
Prof Tim Benton PERSON
the University of Leeds ORG
UK GPE

Peter Alexander PERSON
the University of Edinburgh ORG
UK GPE
the last four years DATE
Ted Cruz PERSON
Texas GPE
the United States GPE
Senate ORG
CNN ORG
the G-7 Summit ORG
Italy GPE
Trump PERSON
the Paris Agreement ORG
United Nations ORG
Trump PERSON
Obama GPE
last year DATE
the United States GPE
National Economic Research Associates Economic Consulting ORG
the Paris Agreement ORG
$3 trillion MONEY
6.5 million CARDINAL
7,000 MONEY
American NORP
2040 DATE
2025 DATE
$250 billion MONEY
2.7 million CARDINAL
21% PERCENT
19% PERCENT
11% PERCENT
American NORP
monthly DATE
the United States GPE
American NORP
2016 DATE
American NORP
first ORDINAL
82% PERCENT
the United States GPE
almost one-third CARDINAL
America GPE
America GPE
the next decade DATE
The Clean Power Plan LAW
Texans NORP
16% PERCENT
2030 DATE
the Economic Reliability Council of Texas ORG
thousands CARDINAL

Americans NORP
the Paris Agreement ORG
EPA ORG
America GPE
less than two-tenths CARDINAL
America GPE
Obama GPE
America GPE
Russia GPE
approximately 50% PERCENT
China GPE
India GPE
2030 DATE
American NORP
The Paris Agreement ORG
America GPE
Russia GPE
Arctic LOC
China GPE
Arctic LOC
American NORP
America GPE
US GPE
today DATE
Twitter PRODUCT
Facebook Efforts ORG
US GPE
the Paris Agreement ORG
Trump PERSON
America GPE
the Paris Agreement ORG
Earth LOC
10 CARDINAL
Siberian NORP
Greenland GPE
Antarctic LOC
Proceedings of the National Academy of Sciences ORG
Paris GPE
2C CARDINAL
the end of this century DATE
Fifty years ago DATE
Johan Rockström PERSON
Stockholm Resilience Centre ORG
Johan Rockström PERSON
the Stockholm Resilience Centre ORG
Rockström GPE
Earth LOC
2C ORG
4C CARDINAL
Katherine Richardson PERSON

the University of Copenhagen ORG
Earth LOC
2C GPE
0.25C CARDINAL
0.11C CARDINAL
poles NORP
Rockström GPE
Gaia LOC
Earth LOC
Greenland GPE
Gulf Stream LOC
the Southern Ocean LOC
Antarctic LOC
earlier this year DATE
the Gulf Stream LOC
1,600 years DATE
0.17C per decade DATE
Paris GPE
1.5C-2C CARDINAL
the end of the century DATE
Europe LOC
1C CARDINAL
Rockström PERSON
Prof Martin Siegert PERSON
the Grantham Institute ORG
2C ORG
Rockström PERSON
Paris GPE
2C CARDINAL
50 years ago DATE
the summer of 2018 DATE
wolf PERSON
Phil Williamson PERSON
the University of East Anglia ORG
Earth LOC
95 degrees QUANTITY
Fahrenheit WORK_OF_ART
the coming decades DATE
Paris GPE
Paris GPE
Days per year DATE
95 CARDINAL
the Climate Impact Lab EVENT
95-degree QUANTITY
35 degrees QUANTITY
this century DATE
Paris GPE
Washington GPE
1986 to 2005 DATE
an average of seven days DATE

at least 95 CARDINAL
the end of the century DATE
29 CARDINAL
14 CARDINAL
Phoenix GPE
124 days per year DATE
95 CARDINAL
the end of the century DATE
around 155 days DATE
an extra month DATE
each year DATE
Madrid GPE
eight CARDINAL
days per year DATE
43 DATE
Beijing GPE
nine to 35 DATE
New Delhi GPE
India GPE
105 days DATE
at least 95 CARDINAL
each year DATE
137 CARDINAL
the first decade of this century DATE
7.2 degrees QUANTITY
Fahrenheit WORK_OF_ART
the end of the century DATE
Days per year DATE
95 CARDINAL
2100 DATE
Washington GPE
95-degree QUANTITY
one-fifth CARDINAL
around 74 days DATE
Brazil GPE
Africa LOC
the year DATE
95-degree QUANTITY
the United States GPE
One CARDINAL
the United States GPE
7.2 percent PERCENT
this century DATE
monthly DATE
California GPE
65°F day, 1999 to 2009 DATE
annual DATE
U.S. GPE
32 CARDINAL
day, 1950 to 2015 DATE

40 CARDINAL
60 80 CARDINAL
60 80 CARDINAL
California GPE
8 CARDINAL
6 4 DATE
4 CARDINAL
2 CARDINAL
monthly DATE
California GPE
65°F day, 1999 to 2009 DATE
annual DATE
U.S. GPE
32 CARDINAL
day, 1950 to 2015 DATE
40 CARDINAL
60 80 CARDINAL
60 80 CARDINAL
100 +10% PERCENT
California GPE
8 CARDINAL
6 4 DATE
2 CARDINAL
monthly DATE
California GPE
65°F day, 1999 to DATE
2009 DATE
40 CARDINAL
60 80 CARDINAL
100 +10% PERCENT
California GPE
8 CARDINAL
2 CARDINAL
annual DATE
U.S. GPE
32 CARDINAL
day, 1950 to 2015 DATE
40 CARDINAL
60 80 CARDINAL
0 CARDINAL
2 CARDINAL
University of California, ORG
Berkeley GPE
NBER ORG
Michael J. Roberts/University of Hawaii PERSON
Wolfram Schlenker/Columbia University ORG
Via Tamma Carleton/ Science PERSON
the hottest days DATE
One CARDINAL
India GPE

3.2 percent PERCENT
1.8 degrees QUANTITY
Fahrenheit WORK_OF_ART
68 CARDINAL
1 degree Celsius QUANTITY
20 CARDINAL
the United States GPE
84 degrees QUANTITY
Fahrenheit WORK_OF_ART
29 degrees QUANTITY
Trevor Houser PERSON
the Climate Impact Lab LAW
the United States GPE
more beach days DATE
Solomon Hsiang PERSON
the University of California, Berkeley ORG
Earth LOC
the Medieval Warm Period of the years 800 to FAC
1200 CARDINAL
the Little Ice Age GPE
roughly 1300 to 1850 DATE
Wednesday DATE
the past 150 years DATE
the past 2,000 years DATE
today DATE
Scott St. George PERSON
the University of Minnesota ORG
Minneapolis GPE
the earliest days DATE
the Roman Empire GPE
the last few decades DATE
the beginning of the 20th century DATE
Earth LOC
about 2 degrees QUANTITY
the United Nations ORG
9 degrees QUANTITY
2100 DATE
One CARDINAL
Nature WORK_OF_ART
the Little Ice Age GPE
first ORDINAL
the past two millennia DATE
Nature Geoscience WORK_OF_ART
Raphael Neukom PERSON
the University of Bern's Institute of Geography ORG
Switzerland GPE
2,000 years' DATE
the middle of the 19th century DATE
the Little Ice Age ORG
the Pacific Ocean LOC

Europe LOC
North America LOC
n't GPE
another two centuries DATE
the Medieval Warm Period FAC
less than half CARDINAL
more than 98 percent PERCENT
Earth LOC
today DATE
Nathan Steiger PERSON
Columbia University ORG
New York City GPE
today DATE
the last two millennia DATE
the second half of the 20th century DATE
Prior to 1850 DATE
1850 DATE
Gabriela Serrato Marks PERSON
the Massachusetts Institute of Technology ORG
Cambridge GPE
Massachusetts GPE
Serrato Marks PERSON
the Southern Hemisphere LOC
Jennifer Hertzberg PERSON
Old Dominion University ORG
Norfolk GPE
Virginia GPE
the last 2,000 years DATE
Twitter PRODUCT
Facebook and Instagram ORG
90% PERCENT
five CARDINAL
10 billion CARDINAL
a few decades DATE
2.3 billion CARDINAL
2050 DATE
Marco Springmann PERSON
the University of Oxford ORG
10 billion CARDINAL
Prof Johan Rockström PERSON
the Potsdam Institute for Climate Impact Research ORG
Germany GPE
today DATE
UN ORG
Monday DATE
just a dozen years DATE
1.5C ORG
half CARDINAL
Nature WORK_OF_ART
Springmann PERSON

two CARDINAL
About a third CARDINAL
today DATE
2C ORG
75% PERCENT
90% PERCENT
half CARDINAL
UK GPE
US GPE
90% PERCENT
60% PERCENT
between four and six CARDINAL
millions CARDINAL
Springmann ORG
Springmann ORG
Netherlands GPE
Israel GPE
Prof Tim Benton PERSON
the University of Leeds ORG
Prof Peter Smith PERSON
the University of Aberdeen ORG
June 1, 2018 DATE
January 19, 2018 DATE
Paul Nicklen PERSON
Sea Legacy PERSON
Somerset Island GPE
larger Baffin Island LOC
the Canadian Arctic LOC
late summer DATE
Nicklen PERSON
Canada GPE
over 3,000 CARDINAL
Nicklen PERSON
December 5 DATE
One CARDINAL
Inuit NORP
the days DATE
Nicklen PERSON
Nicklen PERSON
400 pounds QUANTITY
Nicklen PERSON
Canada GPE
Nicklen PERSON
The Climate Change Link WORK_OF_ART
one CARDINAL
Nicklen PERSON
Arctic LOC
first ORDINAL
half-ton QUANTITY
summer months DATE

months DATE
Arctic LOC
2002 DATE
World Wildlife Fund ORG
the end of summer DATE
the World Wildlife Fund ORG
Fifteen years later DATE
The National Snow and Ice Data Center ORG
annually DATE
Biosciences PERSON
the Wild Please LOC
1 / CARDINAL
the Hudson Bay LOC
Manitoba GPE
Canada GPE
the Hudson Bay LOC
Manitoba GPE
Canada GPE
Tom Murphy PERSON
National Geographic However ORG
last year DATE
the European Geosciences Union ORG
this year DATE
the U.S. Geological Survey ORG
Modelling GPE
more than 20 CARDINAL
sixth ORDINAL
the United Nations Intergovernmental Panel on Climate Change ORG
next year DATE
2014 DATE
25% PERCENT
5C CARDINAL
280 CARDINAL
the 1980s DATE
Johan Rockström PERSON
the Potsdam Institute for Climate Impact Research ORG
40 years DATE
1.5C PRODUCT
2C ORG
5C CARDINAL
the UK Met Office's ORG
Hadley Centre FAC
EU ORG
Community Earth System Model ORG
Timothy Palmer PERSON
Oxford University ORG
the Met Office's ORG
decades DATE
the past year and a half DATE
Clouds ORG

Palmer PERSON
Nature WORK_OF_ART
Hadley Centre FAC
IPCC ORG
5+C CARDINAL
Catherine Senior PERSON
the Met Office Hadley Centre ORG
first ORDINAL
Rockström GPE
Earth LOC
the Global Warming Policy Foundation ORG
Dr Indur Goklany PERSON
Goklany PERSON
• Empirical PRODUCT
the Great Reset's FAC
Klaus Schwab PERSON
Goklany PERSON
Goklany PERSON
Only one CARDINAL
More hot days DATE
Cyclones GPE
mid-19th century DATE
1961 DATE
31 per cent MONEY
1961 DATE
99 per cent MONEY
the 1920s DATE
1900 DATE
96 per cent MONEY
1950 DATE
habitat ORG
Goklany PERSON
U.S. GPE
the Intergovernmental Panel on Climate Change (IPCC ORG
First Assessment Report ORG
U.S. GPE
IPCC ORG
IPCC ORG
Goklany PERSON
99% PERCENT
the 1920s DATE
Goklany PERSON
Earth LOC
the last 30 years DATE
Bangladesh GPE
Goklany GPE
the green movement's shibboleths ORG
over 2 million CARDINAL
between 1982 and 2016 DATE
7 per cent MONEY

the United States GPE
the World Health Organization (WHO ORG
U.S. GPE
WHO ORG
the United States GPE
one CARDINAL
Germany GPE
Italy GPE
Switzerland GPE
UK GPE
Japan GPE
Austria GPE
France GPE
France GPE
G7 PRODUCT
U.S. GPE
Paris GPE
America GPE
G7 PRODUCT
Canada GPE
WHO ORG
annual DATE
less than 2.5 CARDINAL
WHO ORG
2.5 µm or less QUANTITY
the United States GPE
less than 10 CARDINAL
the United States GPE
8 CARDINAL
China GPE
more than seven CARDINAL
59 DATE
India GPE
66 DATE
Egypt GPE
101 CARDINAL
Saudi Arabia GPE
127 CARDINAL
annual DATE
less than 2.5 CARDINAL
WHO ORG
WHO ORG
25 CARDINAL
three CARDINAL
the United States of America GPE
Chicago GPE
second ORDINAL
Honolulu GPE
fourth ORDINAL
Portland GPE

sixteenth DATE
China GPE
Russia GPE
India GPE
15 CARDINAL
three CARDINAL
China GPE
three CARDINAL
Saudi Arabia GPE
seven CARDINAL
India GPE
U.S. GPE
third ORDINAL
ten CARDINAL
ten CARDINAL
two CARDINAL
U.S. GPE
two CARDINAL
China GPE
two CARDINAL
India GPE
Two CARDINAL
Russian NORP
U.S. GPE
America GPE
Reuters ORG
the United States GPE
one CARDINAL
the World Health Organization ORG
three CARDINAL
as high as 7,000 CARDINAL
ppm ORG
just over CARDINAL
400 ppm QUANTITY
UN ORG
Indur Goklany PERSON
Goklany GPE
earth LOC
the United States GPE
G7 CARDINAL
Follow Thomas D. Williams PERSON
Twitter Follow PERSON
Washington Post ORG
Pruitt PERSON
Brian Schatz PERSON
Hawaii GPE
Pruitt PERSON
EPA ORG
Gina McCarthy PERSON
Obama PERSON

Earth LOC
CNBC ORG
Joe Kernen PERSON
Scott Pruitt PERSON
the Environmental Protection Agency's ORG
last Thursday DATE
Pruitt PERSON
about 95 percent PERCENT
about 400 ppm QUANTITY
0.04 percent PERCENT
the first 20 DATE
30 ppm QUANTITY
first ORDINAL
second ORDINAL
third ORDINAL
fourth ORDINAL
CO2 CARDINAL
Advertisement Earth PERSON
1 CARDINAL
2 CARDINAL
4 CARDINAL
½ x ½ Extending PERSON
third ORDINAL
just 1 CARDINAL
8 CARDINAL
El Niño ORG
La Niña ORG
hundreds CARDINAL
thousands CARDINAL
15 CARDINAL
95 percent PERCENT
Less than 50/50 CARDINAL
15 CARDINAL
46.3 percent PERCENT
Pruitt PERSON
Hurricane Florence EVENT
Hurricane Florence EVENT
Hurricane Florence EVENT
North and South Carolina GPE
NBC News ORG
Kristina Dahl PERSON
about 10 percent PERCENT
the past 70 years DATE
one CARDINAL
Hurricane Harvey ORG
Houston GPE
last year DATE
70 years DATE
Coastal ORG
the Gulf of Mexico LOC

1,000 to 2,000 years ago DATE
today DATE
The Massachusetts Bay Colony ORG
1635 DATE
20-foot QUANTITY
New England LOC
1675 DATE
1635 CARDINAL
2017 DATE
the United States GPE
11 years DATE
Nine years DATE
11-year DATE
NASA ORG
1-in-177-year MONEY
Trump ORG
Paris GPE
Florence GPE
18,000 feet QUANTITY
North America LOC
U.S. GPE
Florence ORG
Dahl PERSON
NBC News ORG
one CARDINAL
Florence GPE
first ORDINAL
North Carolina GPE
Fran PERSON
1996 DATE
22 years ago DATE
one CARDINAL
30 CARDINAL
U.S. GPE
January DATE
recent decades DATE
many decades DATE
1 percent PERCENT
Roy W. Spencer PERSON
the University of Alabama ORG
Huntsville GPE
the Kindle e-books GPE
Inevitable Disaster: Why Hurricanes Can't Be Blamed on Global Warming
WORK_OF_ART
Global Warming Skepticism for Busy People WORK_OF_ART
Two CARDINAL
Northern LOC
Robert Scribbler PERSON
University of Ottawa ORG
Paul Beckwith PERSON

Scribbler ORG
Beckwith ORG
Scribbler ORG
Tuesday DATE
two CARDINAL
between summer and winter DATE
the year DATE
17 1 CARDINAL
Climate ORG
climate-change-8.jpg Climate ORG
1-ClimateChange2-Getty.jpg CARDINAL
Getty Climate ORG
1-ClimateChange3-Getty.jpg CARDINAL
AFP/Getty Climate ORG
1-ClimateChange4-Getty.jpg CARDINAL
Getty Climate ORG
1-ClimateChange5-Getty.jpg CARDINAL
Getty Climate ORG
1-Climatechange6.EPA.jpg CARDINAL
EPA ORG
1-ClimateChange7-Getty.jpg CARDINAL
Getty Climate ORG
Machair.jpg Getty Climate ORG
salt-lake-2.jpg Climate ORG
climate-change-5.jpg Climate ORG
climate-change-12.jpg Climate ORG
the Hemispherical Jet Streams PRODUCT
the Middle Latitudes LOC
Please ORG
Please ORG
CARDINAL
The Independent ORG
CARDINAL
The Independent ORG
Beckwith PERSON
Earth LOC
× Renewable PERSON
Europe LOC
two CARDINAL
one CARDINAL
more than 3 trillion tons QUANTITY
18% PERCENT
2030 DATE
40 CARDINAL
five CARDINAL
UN ORG
Intergovernmental Panel on Climate Change ORG
South Korea GPE
Monday DATE
1.5C ORG

2.7F CARDINAL
Paris GPE
2015 DATE
IPCC ORG
around a quarter CARDINAL
Amazon ORG
Africa LOC
Indonesia GPE
this summer DATE
Sweden GPE
IPCC ORG
Deborah Lawrence PERSON
the University of Virginia ORG
every year DATE
Amazon ORG
Africa LOC
IPCC ORG
1.5C PRODUCT
Lawrence PERSON
Beccs GPE
half CARDINAL
Lawrence PERSON
US GPE
Sahara LOC
Lawrence PERSON
zero CARDINAL
2040 CARDINAL
Lawrence PERSON
at least 1.5C CARDINAL
last week DATE
Paris GPE
NASA ORG
YouTube ORG
Arctic sea LOC
recent years DATE
the seasons DATE
Walt Meier PERSON
NASA ORG
2017 DATE
the hottest years DATE
second ORDINAL
NASA ORG
third ORDINAL
the National Oceanic and Atmospheric Administration ORG
NASA ORG
1880 DATE
Thursday DATE
Washington GPE
The hottest year DATE
2016 DATE

2015 DATE
second ORDINAL
NOAA ORG
third ORDINAL
NASA ORG
three years DATE
three CARDINAL
2017 DATE
2016 DATE
six hottest years DATE
2010 DATE
17 CARDINAL
18 hottest years DATE
2001 DATE
NASA ORG
1.62°F CARDINAL
the 20th century DATE
1.5° CARDINAL
2.7°F CARDINAL
2016 DATE
Paris Climate Agreement EVENT
La Niña ORG
this year DATE
La Niña ORG
late 2016 DATE
2017 DATE
late in the year DATE
El Niño ORG
2015 DATE
2016 DATE
El Niño ORG
Pacific Ocean LOC
years DATE
El Niños ORG
La Niñas PERSON
Pacific LOC
2017 DATE
third ORDINAL
year DATE
La Niña ORG
Earth LOC
NASA ORG
El Niño ORG
La Niña ORG
2017 DATE
2017 Sea DATE
Arctic LOC
Antarctic LOC
Antarctic LOC
a few years ago DATE

2017 DATE
154,000 fewer square miles QUANTITY
1986 DATE
Arctic LOC
second ORDINAL
1979 DATE
only 2016 DATE
the winter months of January-March DATE
1985 DATE
eighth ORDINAL
1968 DATE
Rutgers University's Global Snow Lab ORG
2017 DATE
US GPE
Caribbean LOC
the costliest year DATE
US GPE
ThinkProgress ORG
Global Warming PERSON
410 CARDINAL
ppm ORG
Earth three million years ago DATE
Earth LOC
the Potsdam Institute for Climate Impact Research ORG
Science Advances ORG
three million CARDINAL
years ago DATE
Earth LOC
today DATE
one CARDINAL
between three million years ago DATE
three million years ago DATE
Earth LOC
today DATE
Hmmm NORP
three decades DATE
DEFINITELY ORG
billions-year-old DATE
Denier PERSON
thousands and thousands CARDINAL
the Industrial Age EVENT
Shut PERSON
Denier PERSON
Global Warming ORG
Greenland GPE
West Antarctica LOC
East Antarctic LOC
2,999,971 years DATE
Arnold Schwarzenegger PERSON
Hummer PERSON

7 degrees QUANTITY
Fahrenheit PERSON
poles NORP
some 20 meters QUANTITY
65 feet QUANTITY
2,999,945 years DATE
Americans NORP
Global Warming ORG
ThinkProgress ORG
Earth LOC
several decades DATE
tens of feet QUANTITY
hundreds and hundreds of years DATE
Alexandria Ocasio-Crazy PERSON
12 years DATE
ThinkProgress ORG
65 feet QUANTITY
200 feet QUANTITY
Donald Trump PERSON
U.S. GPE
Paris GPE
just a few decades DATE
Earth LOC
the Global Warming Hoax ORG
seven degrees QUANTITY
2,999,998 years DATE
John Nolte PERSON
Twitter PERSON
Facebook Page ORG
80 CARDINAL
58 CARDINAL
2017 DATE
Consensus WORK_OF_ART
Donald Trump PERSON
Paris GPE
0.8 degrees QUANTITY
the middle of the 19th century DATE
the Little Ice Age GPE
today DATE
MSM ORG
Pacific LOC
Catastrophic Anthropogenic Global Warming ORG
CAGW GPE
China GPE
Russia GPE
Canada GPE
U.S. GPE
Italy GPE
Late 20th century DATE
early 21st century DATE

Kenneth Richard PERSON
No Tricks Zone GPE
the early 1400s DATE
today DATE
Abrantes NORP
Michael Mann PERSON
Hockey Stick FAC
the Medieval Warming Period ORG
Li PERSON
al PERSON
China GPE
8,000 years ago DATE
Guillet NORP
al ORG
the centuries DATE
80 CARDINAL
Nobel WORK_OF_ART
Paul Nurse PERSON
the Royal Society ORG
dozens CARDINAL
Watermelons GPE
Greenies ORG
the next 50 years DATE
the National Academy of Sciences ORG
the United States of America GPE
3 billion CARDINAL
the Associated Press ORG
at least one billion CARDINAL
20 million CARDINAL
Visit Business Insider's ORG
As many as half CARDINAL
2070 DATE
the National Academy of Sciences ORG
the United States of America GPE
the next 50 years DATE
between 1 to 3 billion CARDINAL
2070 DATE
about a third CARDINAL
Marten Scheffer PERSON
Wageningen University ORG
Netherlands GPE
the Associated Press ORG
AP ORG
over 3 billion CARDINAL
at least 1 billion QUANTITY
AP ORG
Cornell University ORG
Natalie Mahowald PERSON
AP ORG
Mahowald PERSON

AP ORG
Scheffer PERSON
AP ORG
1.8 degrees QUANTITY
Fahrenheit WORK_OF_ART
about a billion CARDINAL
annual DATE
the approximately 52 DATE
59 degrees QUANTITY
Fahrenheit WORK_OF_ART
the past 6,000 years DATE
USA Today ORG
the coming 50 years DATE
the past 6,000 years DATE
AP ORG
around 2 billion CARDINAL
the next 50 years DATE
Africa LOC
Asia LOC
South America LOC
Australia GPE
20 million CARDINAL
the Sahara Desert LOC
84 degrees QUANTITY
Fahrenheit WORK_OF_ART
AP ORG
Scheffer PERSON
USA Today ORG
The Great Barrier Reef Why WORK_OF_ART
3,000 CARDINAL
1,625 CARDINAL
hundreds CARDINAL
over 30 CARDINAL
The Great Barrier Reef WORK_OF_ART
3,000 CARDINAL
2,575 kilometers QUANTITY
1,600 miles QUANTITY
about 344,400 square kilometers QUANTITY
133,000 square miles QUANTITY
Australian Great Barrier Reef WORK_OF_ART
Advertisement Advertisement PERSON
four CARDINAL
decades DATE
fourth ORDINAL
the Great Barrier Reef EVENT
1998 DATE
2002 DATE
2016 DATE
2017 DATE
James Kerry PERSON

James Cook University's ORG
ARC Centre of Excellence for Coral Reef Studies ORG
2017 DATE
at least a decade DATE
12 months DATE
zero CARDINAL
2016 DATE
Death Toll WORK_OF_ART
over 8,000 kilometers QUANTITY
5,000) miles QUANTITY
800 CARDINAL
1,500 kilometers QUANTITY
932 miles QUANTITY
the Great Barrier Reef EVENT
less than a year DATE
93 percent PERCENT
Advertisement Advertisement Combined PERSON
Tropical Cyclone Debbie ORG
Guardian ORG
Jon Brodie PERSON
James Cook University ORG
Australian NORP
Advertisement Advertisement As PERSON
the Singularity Global Community ORG
Oroville GPE
Wednesday DATE
five years DATE
California GPE
at least the 1980s DATE
dry years DATE
one CARDINAL
California GPE
one to three CARDINAL
2012 to DATE
one year DATE
last week DATE
almost half CARDINAL
California GPE
thousands CARDINAL
California GPE
tens of millions MONEY
this wet year DATE
the last five years DATE
California GPE
one CARDINAL
California GPE
the last half-century DATE
Americans NORP
First ORDINAL
last three decades DATE

the United States GPE
1.6 degrees QUANTITY
Fahrenheit WORK_OF_ART
the past 30 years DATE
Salida GPE
Colorado GPE
June 18 DATE
AP ORG
Sahara Desert PERSON
20-foot QUANTITY
Earth LOC
today DATE
Earth LOC
Katrin Meissner PERSON
the University of New South Wales ORG
Australia GPE
Paris Climate Agreement ORG
2 degrees Celsius QUANTITY
3.6 degrees QUANTITY
Fahrenheit WORK_OF_ART
2 degrees QUANTITY
1.5 degrees QUANTITY
Earth LOC
Alan Mix PERSON
Oregon State University ORG
Mix PERSON
Earth LOC
the past 3.5 million years DATE
Hubertus Fischer PERSON
the University of Bern ORG
Switzerland GPE
two CARDINAL
Meissner ORG
the next few decades DATE
2100 DATE
Sahara Desert LOC
Meissner ORG
Fischer PERSON
Paris GPE
dozens CARDINAL
17 CARDINAL
last week DATE
Nature Geoscience WORK_OF_ART
British NORP
Florida GPE
Governors NORP
Miami GPE
Geophysical Research Letters ORG
year-on-year DATE
Floridian NORP

three CARDINAL
six CARDINAL
the University of Florida ORG
two CARDINAL
first ORDINAL
El Niño ORG
2-7 years DATE
Florida GPE
El Niño ORG
the North Atlantic Oscillation ORG
two CARDINAL
87% PERCENT
Florida GPE
2100 DATE
2 billion CARDINAL
several million CARDINAL
Florida GPE
Instagram ORG
California GPE
Jerry Brown PERSON
California GPE
Ventura County GPE
Saturday DATE
the Orange County Register ORG
billions and billions of dollars MONEY
one CARDINAL
Southern California Public Radio ORG
year DATE
One CARDINAL
Southern California LOC
Thomas PERSON
150,000 acres QUANTITY
only 15% PERCENT
last winter DATE
the past week DATE
Brown PERSON
Last year DATE
Brown PERSON
Barack Obama PERSON
United States GPE
last month DATE
Brown PERSON
Vatican FAC
Thomas PERSON
the 405 Freeway FAC
Los Angeles GPE
Thursday DATE
75 percent PERCENT
Saturday DATE
afternoon TIME

Southern California Public Radio ORG
Lilac PERSON
several dozen CARDINAL
Thursday DATE
Saturday DATE
evening TIME
Register ORG
The Creek Fire WORK_OF_ART
80% PERCENT
the Rye Fire LOC
65% PERCENT
Saturday DATE
the Los Angeles Times ORG
Southern California LOC
Joel B. Pollak PERSON
Breitbart News ORG
one CARDINAL
2016 DATE
Regnery ORG
Twitter PERSON
Helen Harwatt PERSON
Harwatt PERSON
Oregon State University ORG
Bard College ORG
Loma Linda University ORG
American NORP
one CARDINAL
U.S. GPE
2020 DATE
Barack Obama PERSON
2009 DATE
one CARDINAL
between 46 and 74 percent DATE
Harwatt PERSON
Brazilian NORP
Amazon ORG
38,000 CARDINAL
900 metric tons QUANTITY
Brazil GPE
around 212 million CARDINAL
June DATE
U.S. GPE
Brazil GPE
the United Nations ORG
33 percent PERCENT
Earth LOC
26 percent PERCENT
Earth LOC
almost a third CARDINAL
Earth LOC

Earth LOC
400th FAC
1984 DATE
NOAA ORG
April 2018 DATE
400th consecutive month DATE
December 1984 DATE
Reagan PERSON
second ORDINAL
Dynasty PERSON
Madonna PERSON
Earth LOC
Last month DATE
400th consecutive month DATE
the National Oceanic and Atmospheric Administration ORG
Thursday DATE
just a few decades ago DATE
NOAA ORG
Deke Arndt PERSON
400 CARDINAL
Climate ORG
20th-century DATE
every month DATE
several decades DATE
Arndt ORG
NOAA ORG
last month DATE
3rd ORDINAL
April DATE
Europe LOC
April DATE
Australia GPE
second ORDINAL
Portions of Asia WORK_OF_ART
Pakistan GPE
Nawabshah PERSON
122.4 degrees QUANTITY
April 30 DATE
April DATE
Meteo France PERSON
Argentina GPE
April DATE
1961 DATE
North America LOC
one CARDINAL
Last month DATE
U.S. GPE
48.9 degrees QUANTITY
2.2 degrees QUANTITY
13th-coldest April DATE

1997 DATE
NOAA ORG
Last month DATE
USA GPE
April DATE
more than 20 years DATE
Earth LOC
800,000 years DATE
Earth LOC
5th ORDINAL
the year DATE
NASA ORG
last month DATE
third ORDINAL
April DATE
April DATE
400 CARDINAL
410 CARDINAL
at least the past 800,000 years DATE
the Scripps Institute of Oceanography ORG
Australia GPE
Great Barrier Reef WORK_OF_ART
One CARDINAL
the Great Barrier Reef EVENT
Australian NORP
Monday DATE
Great Barrier Reef Scientists WORK_OF_ART
the Great Barrier Reef FAC
this year DATE
more than two thirds CARDINAL
AFP Newslook Stress ORG
El Niño ORG
Terry Hughes PERSON
the Australian Research Council Centre of Excellence for Coral Reef
Studies ORG
BBC ORG
more than 1,400 miles QUANTITY
Australia GPE
Great Barrier Reef FAC
some 67% PERCENT
6% and 1% PERCENT
one CARDINAL
thousands CARDINAL
the Great Barrier Reef EVENT
the 1980s DATE
hundreds of millions MONEY
Greg Torda PERSON
Centre GPE
USA TODAY ORG
70,000 CARDINAL

$5 billion MONEY
Australian NORP
each year DATE
Centre ORG
the Great Barrier Reef FAC
annual DATE
a decade DATE
Torda ORG
Torda ORG
dozens CARDINAL
the United States GPE
a quarter century DATE
Gernot Wagner PERSON
Harvard University ORG
the Environmental Defense Fund ORG
Greenland GPE
the Dust Bowl EVENT
Midwest LOC
Hsiang PERSON
Science ORG
the United States GPE
America GPE
70 years ago DATE
the United States GPE
U.S. County GPE
2080–2099 CARDINAL
Kopp PERSON
Hsiang PERSON
al. / Science ORG
half CARDINAL
the Gulf of Mexico LOC
20-percent PERCENT
Harvests ORG
summer DATE
an important year DATE
this winter DATE
Park Williams PERSON
the Lamont-Doherty Earth Observatory FAC
Columbia University ORG
the weeks DATE
West LOC
July DATE
August DATE
60 to 90 days DATE
one CARDINAL
John Abatzoglou PERSON
the University of Idaho ORG
this morning TIME
the last 60 days DATE
Spokane GPE

Washington GPE
Medford GPE
Oregon GPE
Seattle GPE
Missoula GPE
earlier this summer DATE
more than three decades DATE
Williams PERSON
United States GPE
1.5 CARDINAL
3 degrees QUANTITY
Williams PERSON
Williams PERSON
last year DATE
the Proceedings of the National Academy of Sciences ORG
Williams PERSON
Abatzoglou GPE
United States GPE
the past 33 years DATE
Massachusetts GPE
Connecticut GPE
Williams PERSON
Science ORG
last year DATE
the mid-1980s DATE
The mid-1980s DATE
Sea LOC
Elizabeth Keatinge PERSON
Earth LOC
Arctic LOC
Antarctic LOC
January DATE
this week DATE
the summer DATE
winter DATE
Arctic sea LOC
this January DATE
5.17 million square miles QUANTITY
the month DATE
38-year DATE
the National Snow and Ice Data Center ORG
100,000 square miles QUANTITY
the previous January DATE
just last year DATE
Arctic sea LOC
January 2017 DATE
January DATE
38 CARDINAL
NSIDC News (@NSIDC ORG
February 7, 2017 January DATE

the Arctic Ocean LOC
NASA ORG
Arctic LOC
9 degrees QUANTITY
the month DATE
Antarctica LOC
Antarctic LOC
summer DATE
the Amundsen Sea LOC
Arctic LOC
U.S. GPE
Sea LOC
the Southern Hemisphere LOC
January 2017 DATE
#Antarctica https://t.co/3pPss4vRVJ pic.twitter.com/IKvLna3Ull MONEY
February 7, 2017 DATE
summer DATE
Arctic LOC
the past few decades DATE
the National Oceanic and Atmospheric Administration ORG
the latter half of the 20th century DATE
Antarctic LOC
wildly year to year DATE
NASA ORG
Walt Meier PERSON
thousands of years DATE
a single year DATE
Stefan Rahmstorf PERSON
the Potsdam Institute for Climate Impact Research ORG
Germany GPE
years DATE
2014 DATE
2010 DATE
2005 DATE
1998 DATE
John R. Christy PERSON
the University of Alabama ORG
Huntsville GPE
2014 DATE
years DATE
only a few hundredths CARDINAL
the end of the 20th century DATE
Christy PERSON
coming decades DATE
a record year DATE
more than a thousand years DATE
Michael E. Mann PERSON
the Pennsylvania State University ORG
NASA ORG
American NORP

the National Oceanic and Atmospheric Administration ORG
Friday DATE
2014 DATE
Japanese NORP
early January DATE
2014 DATE
the warmest year DATE
One CARDINAL
Britain GPE
the coming weeks DATE
BBC Future ORG
the last three years DATE
Lockdown Longreads FAC
World War Two EVENT
first ORDINAL
Miami GPE
Sunny Isles Beach LOC
BMWs ORG
Mercedes ORG
a couple weeks ago DATE
Miami GPE
the Solomon Islands LOC
Kiribati GPE
US GPE
Florida GPE
zero CARDINAL
Pakistani NORP
Meesha Shafi PERSON
up to 3 years DATE
Ali Zafar PERSON
Bollywood GPE
Ali Zafar's PERSON
Meesha GPE
a Pakistani Court ORG
3 years DATE
Meesha GPE
Ali PERSON
2018 DATE
Meesha GPE
#MeToo MONEY
Meesha GPE
Meesha GPE
Ali PERSON
more than one CARDINAL
Ali Zafar PERSON
two CARDINAL
Ali PERSON
Ki Dulhan' PERSON
Meesha GPE
eight CARDINAL

Zafar ORG
Ms Shafi PERSON
two CARDINAL
GAST ORG
recent years DATE
the last 120 years DATE
U.S. GPE
NASA ORG
NOAA ORG
UK Met Office ORG
the early twentieth century DATE
the late twentieth century DATE
Joe D'Aleo PERSON
James Wallace PERSON
Cato Institute ORG
Craig Idso PERSON
the 1940s DATE
NASA ORG
NOAA ORG
the UK Met Office ORG
decades DATE
This summer DATE
Europe LOC
Arctic LOC
80s DATE
Belgian NORP
Xavier Fettweis PERSON
some 40 billion tons QUANTITY
Greenland GPE
the early 1990s DATE
25 years DATE
an estimated two CARDINAL
one-hundredths CARDINAL
Arctic LOC
Sahara LOC
Paris GPE
Berlin GPE
Scientific American ORG
one CARDINAL
1990 DATE
the Intergovernmental Panel on Climate Change ORG
United Nations ORG
thousands CARDINAL
195 CARDINAL
first ORDINAL
Arctic LOC
Antarctic LOC
Climate Fwd: ORG
INCHEON ORG
South Korea GPE

the United Nations ORG
Monday DATE
the Intergovernmental Panel on Climate Change ORG
the United Nations ORG
2040 CARDINAL
Bill Hare PERSON
I.P.C.C. GPE
Climate Analytics ORG
just a few years ago DATE
first ORDINAL
Paris GPE
2015 DATE
as much as 2.7 CARDINAL
1.5 degrees QUANTITY
2040 DATE
3.6 degrees QUANTITY
Fahrenheit WORK_OF_ART
2 degrees Celsius QUANTITY
El Niño ORG
2017 DATE
the year before DATE
the next few years DATE
billions of tons QUANTITY
the United States GPE
Congress ORG
the third year in a row DATE
Wednesday DATE
three CARDINAL
two CARDINAL
American NORP
one CARDINAL
British NORP
annual DATE
Earth LOC
Japan GPE
British NORP
2016 DATE
NOAA ORG
NASA ORG
NASA ORG
Arctic LOC
NASA ORG
2016 DATE
30 degrees QUANTITY
the North Pole LOC
CNN ORG
first ORDINAL
Arctic LOC
Antarctic LOC
this time of year DATE

the beginning of October DATE
first ORDINAL
Arctic LOC
Antarctic LOC
Walt Meier PERSON
the Cryospheric Sciences Laboratory ORG
NASA ORG
Goddard Space Flight Center ORG
1979 DATE
Arctic LOC
Antarctic LOC
Arctic LOC
the past decade DATE
the Southern Hemisphere LOC
each year DATE
2012 DATE
2014 DATE
Antarctic LOC
the Southern Hemisphere LOC
Antarctic sea LOC
Arctic LOC
Antarctica LOC
Meier PERSON
Read More WORK_OF_ART
two CARDINAL
hours TIME
Benjamin H. Strauss PERSON
one CARDINAL
two CARDINAL
Monday DATE
second ORDINAL
28 centuries DATE
the past century DATE
the next few decades DATE
as much as three or CARDINAL
2100 DATE
the 22nd century DATE
1,722 CARDINAL
Theresa May's ORG
Downing Street FAC
Brussels GPE
England GPE
the previous week DATE
Jean-Claude Juncker PERSON
EU ORG
Michel Barnier PERSON
Mrs May PERSON
EU ORG
the next 18 months DATE
Juncker PERSON

two CARDINAL
EU ORG
Canada GPE
EU ORG
Croatia GPE
2011 DATE
Mrs May PERSON
The Comprehensive Economic and Trade Agreement ORG
Canada GPE
European NORP
1,598 CARDINAL
seven years DATE
Croatia PERSON
35 CARDINAL
only six CARDINAL
124 CARDINAL
six years DATE
Global sea LOC
the end of the century DATE
another 2 feet QUANTITY
CNN ORG
Monday DATE
the National Academy of Sciences ORG
University of Colorado-Boulder ORG
Steve Nerem PERSON
1993 DATE
between 1992 and 2014 DATE
7 centimeters QUANTITY
2.8 inches QUANTITY
25 years DATE
about 3 CARDINAL
0.1 inches QUANTITY
Read More WORK_OF_ART
Feb. 21, 2019 DATE
meet The Western Journal's Editorial Standards ORG
the Op-Ed FAC
The Western Journal ORG
Editorial Standards WORK_OF_ART
The Western Journal ORG
the North Pole LOC
Arctic LOC
winter DATE
nearly four decades DATE
the third straight year DATE
Arctic LOC
Arctic sea LOC
Mark Serreze PERSON
the National Snow and Ice Data Center ORG
Boulder GPE
Colo. GPE

Serreze PERSON
summer DATE
2030 DATE
a decade DATE
two CARDINAL
Earth LOC
Anthropocene GPE
1,000 CARDINAL
Sun ORG
today DATE
Two CARDINAL
last week DATE
one CARDINAL
One CARDINAL
the European Space Agency ORG
2013 DATE
2014 DATE
years DATE
Arctic LOC
as much as 33 per cent PERCENT
Canadian NORP
Arctic LOC
the thickest summer DATE
Hudson Bay LOC
20 years DATE
1 CARDINAL
Saint Francis PERSON
Assisi GPE
earth LOC
2:7 CARDINAL
3 CARDINAL
More than fifty years ago DATE
Saint John XXIII PERSON
Encyclical ORG
Terris GPE
Catholic NORP
Church ORG
Encyclical ORG
4. CARDINAL
1971 DATE
eight years DATE
Pacem PERSON
Terris GPE
Blessed Pope PERSON
Paul VI PERSON
the Food and Agriculture Organization of the United Nations ORG
Saint John Paul II PERSON
Encyclical ORG
today DATE
6 CARDINAL

Benedict XVI PERSON
Benedict PERSON
Benedict PERSON
7 CARDINAL
Church ORG
the Catholic Church ORG
Churches PRODUCT
Christian NORP
Ecumenical Patriarch Bartholomew ORG
8 CARDINAL
Patriarch Bartholomew PERSON
earth LOC
Bartholomew PERSON
Christians NORP
Saint Francis PERSON
Assisi GPE
Encyclical ORG
Bishop ORG
Rome GPE
Saint Francis PERSON
non-Christians NORP
11 CARDINAL
Francis PERSON
Saint Bonaventure GPE
Saint Francis PERSON
12 CARDINAL
Saint Francis PERSON
Wis 13:5 PRODUCT
Rom 1:20 DATE
Francis PERSON
13 CARDINAL
Southern Africa LOC
22 CARDINAL
15 CARDINAL
Encyclical Letter ORG
Church ORG
today DATE
Judaeo-Christian NORP
Christian NORP
16. CARDINAL
Encyclical ORG
CHAPTER ORG
17 CARDINAL
18 CARDINAL
today DATE
today DATE
20 CARDINAL
daily DATE
millions CARDINAL
one CARDINAL

21 CARDINAL
Each year DATE
hundreds of millions of tons MONEY
22 CARDINAL
one CARDINAL
one CARDINAL
23 CARDINAL
recent decades DATE
earth LOC
recent decades DATE
earth LOC
24 CARDINAL
this century DATE
a quarter CARDINAL
25 CARDINAL
one CARDINAL
our day DATE
coming decades DATE
26 CARDINAL
the next few years DATE
27 CARDINAL
28 CARDINAL
Africa LOC
29 CARDINAL
One CARDINAL
30 CARDINAL
31 CARDINAL
a few decades DATE
billions CARDINAL
32 CARDINAL
earth LOC
years DATE
33 CARDINAL
thousands CARDINAL
thousands CARDINAL
34 CARDINAL
35 CARDINAL
36 CARDINAL
James Lovelock PERSON
Adrian Sherratt/The Guardian Fracking ORG
97 DATE
Gaia LOC
James Lovelock's PERSON
20 years DATE
early 2008 DATE
the end of this century DATE
80% PERCENT
Lovelock PERSON
Britain GPE
more than 50 years DATE

Lovelock PERSON
James Lovelock PERSON
2014 DATE
Guardian ORG
Eight years DATE
97 DATE
Earth LOC
every day DATE
more than five CARDINAL
Singapore GPE
two-and-a-half DATE
One CARDINAL
Lovelock PERSON
Lovelock PERSON
decades DATE
third ORDINAL
one CARDINAL
1991 DATE
one CARDINAL
Gaia LOC
Buckingham Palace FAC
Princess Anne PERSON
Prince Charles PERSON
Highgrove, Lovelock ORG
one CARDINAL
n't GPE
Devon PERSON
more than 35 years DATE
Chesil Beach GPE
Dorset GPE
just six months DATE
6,000 MONEY
George Monbiot PERSON
Monbiot PERSON
US GPE
six months DATE
just £60 MONEY
America GPE
Lovelock PERSON
Sainsburys GPE
about 50 years DATE
100 CARDINAL
three CARDINAL
about 200 years DATE
100 sq miles QUANTITY
Sahara LOC
Europe LOC
the end of this century DATE
a million CARDINAL
Nick Bostrom PERSON

Elon Musk PERSON
Stephen Hawking PERSON
Lovelock PERSON
n't GPE
Darwin PERSON
Darwinism NORP
the University of Houston ORG
Texas GPE
1962 DATE
Guardian ORG
Lovelock PERSON
one million CARDINAL
a million CARDINAL
second ORDINAL
a million seconds TIME
million CARDINAL
one CARDINAL
Frankenstein PERSON
million CARDINAL
80% PERCENT
One CARDINAL
just the same 50 years ago DATE
Bill Clinton PERSON
West LOC
10 million feet QUANTITY
each year DATE
Forest Service ORG
between 1960 and 1990 DATE
10.3 billion MONEY
Clinton PERSON
Northwest Forest Plan ORG
Bill Clinton PERSON
Bob Zybach PERSON
the Daily Caller News Foundation ORG
Zybach PERSON
Clinton PERSON
the mid-1990s DATE
the Ecological Society of America ORG
2019 DATE
Zybach PERSON
California GPE
Oregon GPE
Washington GPE
26 CARDINAL
Bill Clinton PERSON
nearly 30 years ago DATE
the West Coast LOC
one CARDINAL
years ago DATE
2001 DATE

Clinton PERSON
the United States Forest Service ORG
West LOC
Bob Zybach PERSON
PhD WORK_OF_ART
the Daily Caller News Foundation ORG
Zybach PERSON
Thirty years later DATE
Zybach PERSON
more than 20 years DATE
years ago DATE
Oregon GPE
California GPE
Zybach PERSON
Years DATE
Zybach PERSON
California GPE
Oregon GPE
Washington GPE
26 CARDINAL
West Coast LOC
August DATE
19 CARDINAL
California GPE
more than half CARDINAL
Oregon GPE
roughly 10% PERCENT
Roughly 100 CARDINAL
Saturday DATE
West LOC
12 CARDINAL
Idaho GPE
nine CARDINAL
Montana GPE
the National Interagency Fire Center ORG
Saturday DATE
more than 4.5 million acres MONEY
12 CARDINAL
Blackouts And High Gas Prices PERSON
Californians NORP
Clinton PERSON
the Roadless Rule WORK_OF_ART
49 million acres QUANTITY
National Forest ORG
the Northwest Forest Plan ORG
NWFP ORG
Clinton PERSON
1994 DATE
The New York Times ORG
the Ecological Study of America ORG

2019 DATE
the beginning of the 20th century DATE
Guardian ORG
Ten years DATE
Clinton PERSON
Wildlife Service ORG
the Endangered Species Act LAW
the Forest Service ORG
2015 DATE
the Reason Foundation ORG
10.3 billion feet MONEY
each year DATE
Forest Service ORG
between 1960 and 1990 DATE
between 1991 and 2000 DATE
only 2.1 billion feet QUANTITY
between 2000 and 2013 DATE
80% PERCENT
BBC ORG
Times ORG
the Northwest Forest Plan ORG
the Ecological Society of America ORG
hundreds of thousands CARDINAL
Zybach PERSON
Native American NORP
Indians NORP
Clinton PERSON
West LOC
1910 DATE
Yellowstone GPE
Zybach PERSON
Oregon GPE
Evergreen ORG
1994 DATE
NWFP ORG
Oregon GPE
one CARDINAL
above 10,000 acres QUANTITY
between 1952 and 1987 DATE
The Silver Complex Fire ORG
1987 DATE
more than 100,000 acres QUANTITY
Kalmiopsis Wilderness ORG
the Mendocino Complex Fire ORG
California GPE
more than 283,000 acres QUANTITY
Zybach PERSON
University of Washington ORG
Cliff Mass PERSON
DCNF ORG

2018 DATE
years DATE
California GPE
summer DATE
The Washington Post ORG
West LOC
August DATE
fall days DATE
California GPE
the 1980s DATE
U.S. Forest Service ORG
Eric Knapp PERSON
Post ORG
the Creek Fire FAC
Post ORG
Barack Obama PERSON
the West Coast LOC
Senate ORG
Chuck Schumer PERSON
New York GPE
Democrat NORP
Sept. 10 DATE
CBS ORG
California GPE
Tim Ingalsbee PERSON
the 1980s DATE
ProPublica ORG
August DATE
years DATE
Cassandra NORP
Ingalsbee ORG
Greek NORP
US GPE
US GPE
Deerhorn Valley LOC
the Harris Fire FAC
70,000 acres QUANTITY
October 24, 2007 DATE
Jamul GPE
California GPE
California GPE
Santa Ana Wind GPE
Chaparral habitat ORG
130 years ago DATE
San Diego County GPE
As many as 500,000 CARDINAL
Overgrown GPE
California GPE
2017 DATE
Sasha Berleman PERSON

High Country News ORG
California GPE
October of 2017 DATE
42 CARDINAL
nearly 7,000 CARDINAL
Nearly 20 million acres QUANTITY
California GPE
Maine GPE
January DATE
1.5 degrees QUANTITY
1.5C CARDINAL
three years DATE
a week DATE
South Korea GPE
the Intergovernmental Panel on Climate Change (IPCC ORG
33 CARDINAL
first ORDINAL
1.5C PRODUCT
two degrees QUANTITY
Prof Jim Skea PERSON
IPCC ORG
second ORDINAL
1.5C PRODUCT
one CARDINAL
Graphic PERSON
Presentational NORP
IDIOTS ORG
Kaisa Kosonen PERSON
Greenpeace ORG
two CARDINAL
this century DATE
1.5C ORG
1.5C ORG
just 12 years DATE
2030 DATE
every year DATE
about 2.5% PERCENT
two decades DATE
Five CARDINAL
four CARDINAL
• PRODUCT
• PRODUCT
• PRODUCT
• PRODUCT
Lifestyle PERSON
Debra Roberts PERSON
IPCC ORG
this summer DATE
Presentational NORP
Five CARDINAL

1.5 CARDINAL
45% PERCENT
2010 DATE
Renewables PRODUCT
up to 85% PERCENT
2050 DATE
Coal ORG
seven million CARDINAL
Australia GPE
zero CARDINAL
2050 CARDINAL
1.5C PRODUCT
annual DATE
around $2.4 trillion MONEY
between 2016 and 2035 DATE
Dr Stephen Cornelius PERSON
UK GPE
later this century DATE
1.5 degrees QUANTITY
2C ORG
1.5 CARDINAL
two CARDINAL
Five CARDINAL
Vietnam GPE
years DATE
20th Century DATE
2019 10 DATE
1.5C PRODUCT
100% PERCENT
two degrees QUANTITY
about 10cm QUANTITY
4 CARDINAL
1.5C PRODUCT
10 million CARDINAL
one CARDINAL
Kaisa Kosonen PERSON
Greenpeace ORG
hundreds of years DATE
summer DATE
1980 DATE
7.7 million square kilometres QUANTITY
This year DATE
4.7 million square kilometres.2012 QUANTITY
the lowest year DATE
3.6 million square kilometres - less than half QUANTITY
1980 DATE
1980 DATE
2012 DATE
David Shukman PERSON
BBC ORG

later this century DATE
mid-century DATE
California GPE
1.5 CARDINAL
two degrees QUANTITY
the three years DATE
1.5C PRODUCT
Pacific LOC
Dr Amjad Abdulla PERSON
IPCC ORG
Maldives GPE
Paris GPE
2030 DATE
1.5C ORG
Prof Jim Skea PERSON
1.5C ORG
Kaisa Kosonen PERSON
the year DATE
Arctic LOC
hundreds of millions MONEY
North America LOC
Europe LOC
Asia LOC
Guardian ORG
winters DATE
summer DATE
Arctic LOC
the 1970s DATE
about three-quarters CARDINAL
Arctic LOC
33C CARDINAL
the Russian Arctic LOC
20C CARDINAL
November DATE
Prof Jennifer Francis PERSON
Arctic LOC
Rutgers University ORG
US GPE
first ORDINAL
the 1980s DATE
Arctic LOC
El Niño ORG
Arctic LOC
Arctic LOC
Arctic LOC
Arctic sea LOC
at least four years old DATE
718,000 sq miles QUANTITY
September 1984 DATE
42,000 sq miles QUANTITY

September 2016 DATE
Nasa ORG
Arctic LOC
Antarctic LOC
Arctic LOC
Arctic LOC
250mph QUANTITY
about 8km QUANTITY
weeks DATE
Arctic LOC
summer DATE
winter DATE
Dim Coumou PERSON
the Potsdam Institute for Climate Impact Research ORG
Germany GPE
Coumou ORG
2010 DATE
A couple of years ago DATE
El Niño ORG
Arctic LOC
winter DATE
North America LOC
Europe LOC
2009-10 DATE
2013 DATE
billions of dollars MONEY
those years DATE
UK GPE
Met Office ORG
Arctic LOC
winters DATE
California GPE
California GPE
Francis PERSON
2004 DATE
the past two winters DATE
UK GPE
Prof Edward Hanna PERSON
the University of Sheffield ORG
UK GPE
150 years DATE
Guardian ORG
the North Atlantic Oscillation ORG
NAO ORG
Arctic LOC
NOA ORG
the last century DATE
the last decade DATE
NAO ORG
December DATE

Arctic LOC
summer DATE
winter DATE
2010 summer DATE
Pakistan GPE
2,000 CARDINAL
20 million CARDINAL
Russia GPE
the same year DATE
50,000 CARDINAL
15bn MONEY
Peshawar GPE
Pakistan GPE
April 2016 DATE
summer DATE
recent years DATE
Coumou ORG
summer DATE
UK GPE
2007 DATE
2012 DATE
billions of pounds MONEY
The year 2012 DATE
an extreme year DATE
Greenland GPE
Greenland GPE
that year DATE
one CARDINAL
recent years DATE
Hurricane Sandy EVENT
233 CARDINAL
75bn MONEY
Greenland GPE
Arctic LOC
that summer DATE
Atlantic LOC
Sandy ORG
the east coast LOC
US GPE
Hurricane Sandy EVENT
Rodanthe GPE
North Carolina GPE
October 2012 DATE
Arctic LOC
Atlantic LOC
Europe LOC
Greenland GPE
about 250bn tonnes QUANTITY
Atlantic LOC
a millennium DATE

Atlantic LOC
Prof James Hansen PERSON
Atlantic LOC
Hansen PERSON
first ORDINAL
1988 DATE
the White House ORG
118,000 years ago DATE
1,000-tonne QUANTITY
Bahamas GPE
Coumou ORG
Coumou ORG
Svalbard PERSON
last winter DATE
US GPE
Francis PERSON
Arctic LOC
Hansen PERSON
Peter Wadhams PERSON
summer DATE
Peter Wadhams PERSON
summer DATE
Peter Wadhams PERSON
Arctic LOC
more than 50 CARDINAL
one CARDINAL
first ORDINAL
Arctic LOC
the Scott Polar Institute ORG
Cambridge GPE
1987 to DATE
1992 DATE
Cambridge GPE
2001 DATE
A Farewell PERSON
Arctic LOC
Arctic sea LOC
the middle of this decade DATE
zero CARDINAL
summer DATE
this year DATE
Arctic LOC
summer DATE
Next year DATE
the year DATE
summer DATE
Arctic LOC
about a million square kilometres QUANTITY
Arctic LOC
summer DATE

the Northwest Passage ORG
Canadian NORP
Arctic LOC
summer 2017 DATE
2018 DATE
Arctic LOC
summer DATE
Arctic LOC
summer DATE
One CARDINAL
about 50% PERCENT
less than 10% PERCENT
Siberia LOC
Greenland GPE
50% PERCENT
Greenland GPE
about 300 cubic kilometres QUANTITY
Antarctica LOC
the Intergovernmental Panel on Climate Change (IPCC ORG
60 CARDINAL
this century DATE
one to two metres QUANTITY
Thames NORP
Britain GPE
Bangladesh GPE
Russian NORP
Arctic LOC
around 2005 DATE
summer DATE
three or four months DATE
the last ice age DATE
the last century DATE
Jason Box PERSON
Denmark GPE
the Greenland Survey ORG
NOAA ORG
Nasa Suomi NPP ORG
May 30, 2016 DATE
Arctic LOC
Alaska GPE
NOAA ORG
Nasa Suomi NPP ORG
May 30, 2016 DATE
Arctic LOC
Alaska GPE
Arctic LOC
May 2016 DATE
Suomi NPP/NASA/NOAA How ORG
23 CARDINAL
eight years DATE

about 100 years DATE
Today DATE
1,000 years DATE
last century's DATE
IPCC ORG
40% to 50% PERCENT
one CARDINAL
Eight CARDINAL
the Arctic Circle LOC
Five CARDINAL
Russia GPE
Arctic LOC
Russian NORP
Russia GPE
Novaya Zemlya PERSON
Getty Images ORG
about 0.9 degrees Celsius QUANTITY
1.7 degrees QUANTITY
Fahrenheit WORK_OF_ART
1880 DATE
Arctic LOC
The most recent year DATE
October 2015 to September 2016 DATE
3.5C CARDINAL
the early 1900s DATE
2016 DATE
Arctic Report Card LOC
Northern Canada ORG
Svalbard GPE
Norway GPE
Russia GPE
Kara Sea PERSON
last fall DATE
Arctic LOC
Arctic LOC
Arctic LOC
Arctic LOC
three-and-a-half decades DATE
Mark Serreze PERSON
the National Snow and Ice Data ORG
the last year DATE
Climatic Research Unit ORG
University of East Anglia ORG
2016-2017 DATE
more than 20 percent PERCENT
daily DATE
80 degrees QUANTITY
198020162016—2017 CARDINAL
2 CARDINAL
4 CARDINAL

Danish Meteorological Institute ORG
Nico Sun Photo ORG
eight-hour TIME
NASA ORG
IceBridge ORG
Arctic LOC
Greenland GPE
Mario Tama/Getty Images Sea PERSON
Last month DATE
March DATE
2015 DATE
23,000 square miles QUANTITY
1981-2010 DATE
September DATE
more than 13 percent PERCENT
Nature Climate Change WORK_OF_ART
30-50 percent PERCENT
Earth LOC
Arctic LOC
Arctic Sea Ice Weekly LOC
5 CARDINAL
20 CARDINAL
NASA ORG
1985 DATE
about 45 percent PERCENT
Arctic sea LOC
multi-year DATE
2016 DATE
22 percent PERCENT
Arctic LOC
Vladimir Putin PERSON
Russia GPE
Arctic LOC
Russian NORP
more than half CARDINAL
Arctic LOC
multi-year DATE
Arctic LOC
the Northern Sea Route LOC
Russian NORP
Western Europe LOC
East Asia LOC
Arctic Sea Ice Weekly LOC
1984—2016 CARDINAL
9+ years DATE
1984 DATE
1985 1990 1995 2000 DATE
2010 2015 DATE
NASA ORG
Alaska GPE

about 3 degrees QUANTITY
Fahrenheit WORK_OF_ART
the last several decades DATE
the Tracy Arm Fjord PERSON
Juneau GPE
Paulo Costa/Getty Images Sea PERSON
Greenland GPE
Last year DATE
Greenland GPE
second ORDINAL
30 to 40 days DATE
Greenland GPE
20 feet QUANTITY
centuries DATE
2002 DATE
Monthly DATE
Greenland GPE
NASA ORG
Arctic LOC
recent years DATE
Canadian NORP
Russian Arctic LOC
5 CARDINAL
19 percent PERCENT
2003-2015 DATE
NOAA ORG
November DATE
Johan Rockström PERSON
the Stockholm Resilience Center ORG
Canada GPE
Russia GPE
U.S. GPE
Arctic LOC
Arctic LOC
today DATE
the spring and summer DATE
Frozen Thawed PERSON
NASA ORG
Russia GPE
30 to 40 CARDINAL
the Russian Arctic LOC
Russia GPE
Yamal Peninsula PERSON
Siberian NORP
Vasily Bogoyavlensky/AFP PERSON
Getty Images ORG
Arctic LOC
Arctic LOC
Arctic LOC
Nearly a fifth CARDINAL

Bangladesh GPE
South Asia LOC
Pacific LOC
Miami GPE
New York GPE
2 degrees Celsius QUANTITY
Earth LOC
CNN International ORG
Brandon Miller PERSON
this month DATE
CNN ORG
2 degrees QUANTITY
2 degrees QUANTITY
1. CARDINAL
two CARDINAL
2. CARDINAL
1900 DATE
about 20 cm QUANTITY
8 inches QUANTITY
the past 2,000 years DATE
several hundred years DATE
the past century DATE
the last 25 years DATE
the past 20 years DATE
the past 100 years DATE
3 CARDINAL
2 degrees QUANTITY
2 degrees Celsius QUANTITY
3.6 CARDINAL
2 degrees QUANTITY
many centuries DATE
120,000 years ago DATE
2 degrees QUANTITY
about 5 meters QUANTITY
16 feet QUANTITY
today DATE
Nearly 500 million CARDINAL
5 meters QUANTITY
4. CARDINAL
2100 DATE
the Intergovernmental Panel on Climate Change (IPCC ORG
2 CARDINAL
the end of this century DATE
about a half CARDINAL
1.5 feet QUANTITY
around 40 cm (15 inches QUANTITY
80 cm QUANTITY
31 inches QUANTITY
2100 DATE
5 CARDINAL

One CARDINAL
the Greenland Ice Sheet ORG
7 meters QUANTITY
23 feet QUANTITY
between 1 degree QUANTITY
4 degrees QUANTITY
2 degrees QUANTITY
the Greenland Ice Sheet ORG
Greenland GPE
thousands of years DATE
6. CARDINAL
Pacific LOC
the end of this century DATE
the Marshall Islands GPE
99% PERCENT
5 meters QUANTITY
Pacific LOC
Bangladesh GPE
Bangladesh GPE
Bangladesh GPE
Brahmaputra ORG
Himalayas LOC
eighth ORDINAL
158 million CARDINAL
U.S. GPE
New York GPE
NOLA GPE
Miami GPE
The World Bank ORG
five CARDINAL
10 CARDINAL
the United States GPE
Miami GPE
2 CARDINAL
New York GPE
3 CARDINAL
New Orleans GPE
4 CARDINAL
Tampa GPE
Boston GPE
8) CARDINAL
2014 DATE
U.S. National Climate Assessment EVENT
New York City GPE
nearly 4 feet QUANTITY
2100 DATE
4-foot QUANTITY
New York GPE
nearly 100,000 CARDINAL
New York City GPE

$16.5 billion MONEY
9. CARDINAL
2-degree QUANTITY
hundreds of millions MONEY
Asia LOC
East, Southeast LOC
South Asia LOC
up to 30 percent PERCENT
Hurricane Harvey PERSON
Texas GPE
the International Space Station ORG
Sunday DATE
afternoon TIME
Hurricane Harvey EVENT
Houston GPE
Wednesday night TIME
50 inches QUANTITY
Houston GPE
50 inches QUANTITY
Texas GPE
the National Weather Service ORG
several days DATE
years DATE
thousands CARDINAL
perhaps tens of thousands CARDINAL
Earth LOC
one CARDINAL
Hurricane Harvey EVENT
Harvey. ORG
Harvey PERSON
one CARDINAL
the Gulf of Mexico LOC
Houston GPE
last week DATE
Texas GPE
between 2.7 and CARDINAL
7.2 degrees QUANTITY
Fahrenheit WORK_OF_ART
four CARDINAL
roughly 48 hours TIME
Kevin Trenberth PERSON
the U.S. National Center for Atmospheric Research ORG
one CARDINAL
Harvey's ORG
Texas GPE
Gulf of Mexico LOC
the past 30 years DATE
Florida GPE
the last 12 hours TIME
n't Harvey PERSON

Harvey PERSON
100 or even 200 meters QUANTITY
Trenberth GPE
Harvey PERSON
Harvey PERSON
Houston GPE
Harvey PERSON
one CARDINAL
hurricane season DATE
Trenberth ORG
up to 30 percent PERCENT
Atlantic Ocean LOC
U.S. GPE
later this year DATE
North Atlantic LOC
the 1970s DATE
Houston GPE
zero CARDINAL
four CARDINAL
100-year DATE
the spring of 2015 DATE
Eric Holthaus PERSON
167 percent PERCENT
the 1950s DATE
only one-sixth CARDINAL
Harvey PERSON
Harvey PERSON
Harris County GPE
2001 DATE
half CARDINAL
Sunday DATE
afternoon TIME
Buffalo Bayou PERSON
Houston GPE
one foot QUANTITY
today DATE
more than a trillion metric tons MONEY
the Antarctic Peninsula LOC
one CARDINAL
Antarctic LOC
more than 120 miles QUANTITY
several years DATE
Larsen C ORG
Wednesday DATE
100 CARDINAL
the Antarctic Peninsula LOC
90º DATE
May DATE
WEDDELL SEA Delaware ORG
May 31 DATE

SOUTH ATLANTIC LOC
May 1 DATE
ICEBERG ORG
Jan. 1, 2017 DATE
June 2016 DATE
2010 DATE
Larsen C PERSON
The New York Times ORG
NASA Blue Marble ORG
NOAA ORG
NASA ORG
CIMSS PRODUCT
the Antarctic Peninsula LOC
Project Midas PERSON
Swansea University ORG
Aberystwyth University ORG
Britain GPE
2014 DATE
Adrian Luckman PERSON
Project Midas PERSON
Thin sea ice Ice LOC
820 FEET QUANTITY
about 40 miles QUANTITY
10 CARDINAL
MILES Larsen PERSON
two CARDINAL
Antarctica LOC
the late 20th century DATE
the Antarctic Peninsula LOC
Antarctica LOC
South America LOC
the 21st century DATE
many millions of years DATE
two CARDINAL
Antarctica LOC
Thomas P. Wagner PERSON
NASA ORG
late 2014 to January of this year DATE
Larsen C ORG
months DATE
Eric Rignot PERSON
the University of California, Irvine ORG
two CARDINAL
Rignot PERSON
two CARDINAL
Larsen PERSON
Bawden GPE
Gipps PERSON
Rignot PERSON
Bawden GPE

Bawden GPE
The Antarctic Peninsula LOC
1978 DATE
John H. Mercer PERSON
Ohio State University ORG
Mercer PERSON
Antarctica LOC
Larsen PERSON
several years DATE
1995 DATE
Larsen NORP
2002 DATE
first ORDINAL
Larsen C. " PERSON
Rignot PERSON
Times ORG
Antarctica LOC
the Antarctic Dispatches LOC
four CARDINAL
The Antarctica Series EVENT
one CARDINAL
Wednesday DATE
Nature WORK_OF_ART
Sunke Schmidtko PERSON
two CARDINAL
the GEOMAR Helmholtz Centre for Ocean Research ORG
Kiel GPE
Germany GPE
more than 2 percent PERCENT
between 1960 and 2010 DATE
Pacific LOC
the Arctic Ocean LOC
Earth LOC
Schmidtko PERSON
Lothar Stramma ORG
Martin Visbeck PERSON
GEOMAR ORG
Schmidtko ORG
just 1 percent PERCENT
Earth LOC
Schmidtko PERSON
Schmidtko PERSON
millions CARDINAL
GEOMAR ORG
less than 15 percent PERCENT
Matthew Long PERSON
the National Center for Atmospheric Research ORG
Schmidtko NORP
Schmidtko ORG
Denis Gilbert PERSON

the Maurice Lamontagne Institute at Fisheries and Oceans Canada ORG
Quebec GPE
Nature WORK_OF_ART
2 percent PERCENT
Gilbert PERSON
recent years DATE
Greenland GPE
Antarctica LOC
up to 7 percent PERCENT
2100 DATE
The United States GPE
yesterday DATE
Obama PERSON
Midwest LOC
110 CARDINAL
115 degrees QUANTITY
Saturday DATE
Washington GPE
100 CARDINAL
Friday DATE
the weekend DATE
the coming days DATE
n't GPE
a year DATE
six CARDINAL
the last six months DATE
Marshall Shepherd PERSON
the atmospheric sciences ORG
the University of Georgia ORG
the American Meteorological Society ORG
National Academies ORG
the National Academy of Sciences ORG
The U.S. National Climate Assessment ORG
U.S. GPE
U.S. GPE
Climate ORG
5% PERCENT
1950-1979 DATE
at least 70% PERCENT
2035-2064 DATE
U.S. GPE
Shepherd PERSON
one CARDINAL
first ORDINAL
the Great Barrier Reef EVENT
Australia GPE
one CARDINAL
Texas Tech University ORG
Katharine Hayhoe PERSON
Thursday DATE

Hayhoe PERSON
Shepherd PERSON
today DATE
Hayhoe PERSON
U.S. GPE
2003 DATE
Paris GPE
Europe LOC
hundreds CARDINAL
Paris GPE
London GPE
Arctic LOC
at least one CARDINAL
Monday DATE
Arctic LOC
100 years DATE
Christian Knobloch PERSON
Universität Hamburg FAC
Germany GPE
Nature Climate Change WORK_OF_ART
Knoblauch PERSON
more than seven years long DATE
Siberia LOC
Knoblauch PERSON
Arctic LOC
three years DATE
first ORDINAL
Knoblauch PERSON
Germany GPE
Sweden GPE
Russia GPE
the coming century DATE
one CARDINAL
2015 DATE
Nature WORK_OF_ART
CH4 ORG
a century DATE
Knoblauch ORG
the coming decades DATE
One CARDINAL
Arctic LOC
Merritt Turetsky PERSON
the University of Guelph ORG
Turetsky PERSON
this century DATE
10 percent PERCENT
two CARDINAL
Turetsky PERSON
Róisín Commane PERSON
Harvard ORG

Arctic LOC
Arctic LOC
Commane ORG
2012 DATE
the Northern Hemisphere LOC
hundreds of millions MONEY
the Northern Hemisphere LOC
half a decade DATE
Nature Scientific Reports WORK_OF_ART
Michael Mann PERSON
Pennsylvania State University ORG
the United States GPE
Germany GPE
Netherlands GPE
the spring and summer DATE
2003 DATE
European NORP
2010 DATE
Pakistan GPE
Russian NORP
2011 DATE
Texas GPE
Europe LOC
The Northern Hemisphere LOC
Earth LOC
the North Pole LOC
Arctic LOC
Mann PERSON
summer DATE
Arctic LOC
the last decade DATE
Mann PERSON
One CARDINAL
2012 DATE
Arctic LOC
Stephen Vavrus PERSON
the University of Wisconsin ORG
Monday DATE
Nature GeosciOne LOC
John Fyfe PERSON
the Canadian Center for Climate Modeling and Analysis at Environment
and Climate Change Canada ORG
Mann ORG
the Northern Hemisphere LOC
Mann et al. PERSON
Mann et al. PERSON
the spring and summer DATE
winter DATE
Mann ORG
Mann PERSON

Congress ORG
this week DATE
Arctic LOC
winter DATE
Eurasia GPE
the Marshall Islands GPE
the Marshall Islands GPE
the Pacific Ocean LOC
Auckland University ORG
Murray Ford PERSON
Paul Kench PERSON
six CARDINAL
two CARDINAL
the Marshall Islands GPE
September 2015 DATE
Anthropocene GPE
the middle of the 20th century DATE
the Marshall Islands GPE
the mid-20th century DATE
2010 DATE
Paul Kench PERSON
Arthur Webb PERSON
the South Pacific Applied Geoscience Commission LOC
Fiji GPE
27 CARDINAL
Pacific LOC
14% PERCENT
43% PERCENT
the Marshall Islands GPE
Hilda Heine PERSON
the Marshall Islands GPE
approximately one-third CARDINAL
Some 52.7% PERCENT
the Asian Development Bank ORG
Only 39.3% PERCENT
age 15 years DATE
2015 DATE
the U.S. State Department ORG
Marshallese NORP
America GPE
U.S. GPE
Marshall Island FAC
today DATE
U.S. GPE
CNN ORG
John Sutter PERSON
June 2015 DATE
two CARDINAL
between $1 trillion and $2 trillion MONEY
annually DATE

Paris GPE
China GPE
last November DATE
Global Policy ORG
2030 DATE
the century DATE
more than $100 trillion MONEY
0.3 CARDINAL
0.17 CARDINAL
the Marshall Islands GPE
today DATE
2015 DATE
Greenland GPE
over more than 50% PERCENT
last year DATE
the National Oceanic and Atmospheric Administration ORG
Noaa ORG
hundreds CARDINAL
62 CARDINAL
2015 DATE
George Monbiot PERSON
Michael Mann PERSON
Penn State ORG
Guardian ORG
2015 DATE
Last year DATE
annual DATE
2014 DATE
1C CARDINAL
UN ORG
2016 DATE
annual DATE
14 straight months DATE
El Niño ORG
more than 90% PERCENT
El Niño ORG
Pacific LOC
2C CARDINAL
Arctic LOC
August DATE
2015 DATE
70mm QUANTITY
1993 DATE
3.3mm QUANTITY
Pacific LOC
Indian Oceans NORP
million CARDINAL
Mauna Loa LOC
Hawaii GPE
last year DATE

Noaa ORG
399.4ppm CARDINAL
2.2ppm CARDINAL
2014 DATE
Noaa ORG
2015 DATE
Arctic LOC
37-year DATE
February 2015 DATE
annual DATE
the 36th consecutive year DATE
Greenland GPE
7 CARDINAL
over more than 50% PERCENT
June last year DATE
over 1,000 CARDINAL
Karachi GPE
Pakistan GPE
millions CARDINAL
Ethiopia GPE
Indonesia GPE
Arctic LOC
the west coast LOC
North America LOC
last year DATE
El Niño ORG
Pacific LOC
El Niño ORG
2016 DATE
Thomas Karl PERSON
Noaa ORG
last year's DATE
El Niño ORG
Last year DATE
El Niño ORG
Willett PERSON
Britain GPE
Met Office ORG
75% PERCENT
annual DATE
last year DATE
2015 DATE
2015 DATE
another year DATE
its 26th year DATE
annually DATE
the American Meteorological Society ORG
Bill Shorten PERSON
Greens NORP
the Roman Warming ORG

the Dark Ages GPE
the Medieval Warming FAC
the Little Ice Age GPE
Jack Frost PERSON
Labor ORG
Darwinism NORP
first ORDINAL
JOSEPH PERSON
Thomas PERSON
One CARDINAL
Shorten PERSON
Shorten PERSON
3 per cent MONEY
Australia GPE
1.3 per cent MONEY
3 per cent MONEY
thousands of millions of MONEY
Earth LOC
one CARDINAL
Earth LOC
moon GPE
today DATE
hundreds of billions of dollars MONEY
the past few decades DATE
Labor ORG
50 per cent MONEY
hundreds of billions MONEY
Shorten PERSON
50 per cent MONEY
Labor ORG
tens of billions MONEY
Shorten PERSON
Science WORK_OF_ART
University of California ORG
Davis ORG
Ben Houlton PERSON
centuries DATE
Houlton PERSON
2003 DATE
Science ORG
Ronald Amundson PERSON
the University of California at Berkeley ORG
Chemical and Engineering News ORG
CO2 CARDINAL
years DATE
2011 DATE
Thomas Kuhn PERSON
1962 DATE
"The Structure Of Scientific Revolutions WORK_OF_ART
Einstein PERSON

decade DATE
the National Oceanic and Atmospheric Administration ORG
Earth LOC
Marc Morano PERSON
ClimateDepot ORG
The Politically Incorrect Guide ORG
one CARDINAL
Earth LOC
the World Meteorological Organisation ORG
Cedro ORG
Quixadá GPE
Brazil GPE
2016 DATE
the hottest year DATE
2017 DATE
the World Meteorological Organisation ORG
WMO ORG
2016 DATE
Tuesday DATE
El Niño ORG
2016 DATE
US GPE
February DATE
El Niño ORG
2017 DATE
David Carlson PERSON
WMO ORG
Earth LOC
Jeffrey Kargel PERSON
the University of Arizona ORG
US GPE
Prof David Reay PERSON
the University of Edinburgh ORG
Donald Trump PERSON
Trump ORG
Republicans NORP
Congress ORG
Robert Watson PERSON
UK GPE
University of East Anglia ORG
UN ORG
Watson PERSON
Trump ORG
WMO ORG
Petteri Taalas PERSON
1880 DATE
about 115,000 years ago DATE
4m years DATE
2017 DATE
US GPE

February DATE
Australia GPE
Arctic ice LOC
October DATE
six consecutive months DATE
four-decade DATE
Prof Julienne Stroeve PERSON
University College London ORG
UK GPE
Eel PERSON
Lowell's Cove, FAC
Maine GPE
US GPE
Emily Shuckburgh PERSON
the British Antarctic Survey ORG
Arctic LOC
Greenland GPE
Arctic sea LOC
Europe LOC
Asia LOC
North America LOC
between November 2014 and February 2016 DATE
El Niño ORG
15mm QUANTITY
five years DATE
recent decades DATE
2016 DATE
Arctic LOC
tens CARDINAL
Australia GPE
February DATE
Taalas GPE
Hillary Clinton's PERSON
Manhattan GPE
October 11, 2016 DATE
New York GPE
Al Gore PERSON
Miami GPE
Florida GPE
Hillary Clinton PERSON
Al Gore PERSON
Miami-Dade College GPE
October 11 DATE
Gore PERSON
20 years DATE
Gore PERSON
An Inconvenient Truth ORG
Chapman University ORG
ten CARDINAL
Americans NORP

1 CARDINAL
two CARDINAL
100% PERCENT
only about half CARDINAL
U.S. GPE
centuries DATE
Florida GPE
the Gulf of Mexico LOC
centuries DATE
Strong Sandy-type PERSON
every year DATE
Hurricane Matthew EVENT
4,000 days DATE
3 CARDINAL
U.S. Sea LOC
only 1 inch QUANTITY
10-14 feet QUANTITY
1 inch QUANTITY
Hillary PERSON
Norfolk GPE
Virginia GPE
ex-NASA Goddard Institute for Space Studies ORG
James Hansen PERSON
Paris GPE
the Paris Agreement ORG
more than 15 CARDINAL
15-20% PERCENT
New Delhi GPE
Feb 20 DATE
Disinfo Lab PRODUCT
Greta Thunberg PERSON
Pieter Friedrich PERSON
India GPE
Pakistan GPE
Inter-Services Intelligence ORG
ISI ORG
Greek NORP
Turkey GPE
Pakistan GPE
India GPE
Disinfo ORG
The Unending War: From Proxy War WORK_OF_ART
Info-War ORG
earlier this week DATE
the United States GPE
India GPE
India GPE
India GPE
the 1990s DATE
ISI ORG

Khalistan GPE
Pakistani NORP
Disinfo Lab PRODUCT
Greek NORP
Ankara GPE
India GPE
One CARDINAL
Pieter Friedrich's PERSON
Istanbul GPE
Ali Keskin PERSON
Pakistani NORP
Turkish NORP
MIT ORG
Greek City Times ORG
Turkey GPE
Pakistan GPE
India GPE
Scanning Keskin's PERSON
Twitter PERSON
Greek NORP
India GPE
Greece GPE
France GPE
UAE GPE
Israel GPE
Pakistani NORP
India-UAE ORG
Ali Keskin PERSON
Pakistan GPE
a couple of minutes TIME
Pakistanis PERSON
Keskin PERSON
Turkish NORP
Baba Umar PERSON
ISI ORG
Turkey GPE
India GPE
Pakistani NORP
Umar PERSON
India GPE
pro-Pakistani NORP
Kashmir LOC
one CARDINAL
Khalistani ORG
ISI ORG
Baba Umar PERSON
Pieter Friedrich PERSON
Pakistan GPE
anti-India NORP
Turkey GPE

Caucasian NORP
Greek NORP
Disinfo Lab PRODUCT
Islamabad GPE
K-2 PERSON
2007 DATE
India GPE
four CARDINAL
India GPE
Mahatma Gandhi PERSON
India GPE
India GPE
K-2 PERSON
India GPE
Indian NORP
American NORP
Whitewashing Pakistan's ORG
Pakistan GPE
ISI ORG
Kabul GPE
Gurudwara Bombings ORG
Greek City Times ORG
California GPE
Zahra Billoo PERSON
Turkish NORP
Recep Tayyip Erdogan PERSON
Turkey GPE
Pakistan GPE
Billoo PERSON
US GPE
Tulsi Gabbard's ORG
anti-India NORP
India GPE
Friedrich PERSON
first ORDINAL
Turkey GPE
Pakistan GPE
India GPE
Kashmir LOC
Kurdish NORP
ANF ORG
a few months ago DATE
Turkey GPE
Syria GPE
Kashmir LOC
Pakistan GPE
India GPE
Ankara GPE
Muslims NORP
South Asia LOC

Erdogan ORG
Saudi Arabia's GPE
Islamic NORP
Greenland GPE
annual DATE
two CARDINAL
Johan Petersen PERSON
Greenland GPE
six metres QUANTITY
annual DATE
Greenland GPE
Greenland GPE
six metres QUANTITY
Greenland GPE
20,000 years ago DATE
GPS ORG
Greenland GPE
12mm QUANTITY
19 cubic kilometres QUANTITY
each year DATE
about 8% PERCENT
Greenland GPE
Greenland GPE
40m years ago DATE
Iceland GPE
Greenland GPE
millennia GPE
Greenland GPE
the past and today DATE
the last 20 years DATE
Greenland GPE
decades DATE
Prof Jonathan Bamber PERSON
the University of Bristol ORG
UK GPE
one CARDINAL
Science Advances ORG
One CARDINAL
Dr Christopher Harig PERSON
the University of Arizona ORG
the end of the century DATE
years ago DATE
Pippa Whitehouse PERSON
the University of Durham ORG
GPS ORG
Greenland GPE
Melt PERSON
Greenland GPE
10 June, 2014 DATE
15 June, 2016 DATE

Every spring DATE
early summer DATE
one CARDINAL
2016 DATE
Antarctica LOC
April DATE
Greenland GPE
August DATE
eight-year DATE
more than 250 CARDINAL
quarter DATE
a 12th of today DATE
BIOACID ORG
Germany GPE
annual DATE
this year DATE
Bonn GPE
November DATE
The Biological Impacts of Ocean Acidification ORG
Mesocosms PERSON
the beginning of the Industrial Revolution DATE
8.1 CARDINAL
about 26% PERCENT
Prof Ulf Riebesell PERSON
Kiel PERSON
BBC News ORG
the end of the day DATE
2009 DATE
BIOACID ORG
the North Sea LOC
Baltic LOC
Arctic LOC
Papua New Guinea GPE
more than 350 CARDINAL
next month's DATE
almost half CARDINAL
Atlantic LOC
Carol Turley PERSON
Plymouth Marine Labs ORG
UK GPE
BIOACID ORG
BBC News ORG
UN ORG
Bonn GPE
November DATE
Germany GPE
Fiji GPE
Barack Obama PERSON
National Park Service ORG
the Exit Glacier FAC

Seward GPE
Alaska GPE
Obama PERSON
Exit Glacier PERSON
Alaska GPE
last week DATE
Obama GPE
the United States GPE
Exit Glacier PERSON
200 years DATE
1815 DATE
Alaska GPE
thousands of years DATE
300-year-long DATE
Medieval PERSON
Little Ice Age LOC
around 1300 DATE
300-year DATE
The Anchorage Daily Times ORG
1922 DATE
Arctic LOC
The Arctic Ocean LOC
Obama PERSON
Exit Glacier PERSON
Roger Cohen PERSON
the American Physical Society ORG
The Alaska Climate Research Center ORG
Alaska GPE
1977 DATE
two or three centuries DATE
Will Happer PERSON
Princeton GPE
Obama GPE
Old Testament ORG
Obama PERSON
Alaska GPE
Obama LOC
Alaska GPE
Alaska GPE
Republican NORP
Lisa Murkowski PERSON
Obama LOC
Arctic LOC
Obama PERSON
Murkowski PERSON
Obama GPE
Alaska GPE
the United States GPE
Mediterranean LOC
the Middle East LOC

ISIS ORG
thousands CARDINAL
Christians NORP
Obama PERSON
the North Atlantic Ocean LOC
Earth LOC
the North Atlantic Ocean LOC
the Atlantic Meridional Overturning Circulation ORG
one CARDINAL
Yale University and University of Southhampton ORG
Arctic LOC
AMOC ORG
the Atlantic Ocean LOC
South LOC
Greenland GPE
the North Atlantic Ocean LOC
the Atlantic Ocean LOC
Atlantic LOC
the Northern Atlantic Ocean LOC
Earth LOC
North Atlantic LOC
Europe LOC
one CARDINAL
AMOC ORG
Europe LOC
the Northern Atlantic LOC
the Arctic and Greenland LOC
the North Atlantic LOC
1900 to 2012 DATE
Arctic LOC
the recent decades DATE
September Arctic sea LOC
30% PERCENT
today DATE
1979 DATE
summer months DATE
AMOC ORG
The Day After Tomorrow WORK_OF_ART
New England LOC
Western Europe LOC
today DATE
CNN)Greenland PERSON
Ohio State University ORG
20 or 30 years ago DATE
Ian Howat PERSON
Ohio State University ORG
Greenland GPE
more than 280 billion metric tons MONEY
Michalea King ORG
Ohio State University ORG

recent years DATE
Greenland GPE
Ilulissat Icefjord ORG
July 30, 2019 DATE
Ilulissat GPE
Greenland GPE
Greenland GPE
every year DATE
more than 3 feet QUANTITY
the end of the century DATE
Florida GPE
Just 3 feet QUANTITY
Forty percent PERCENT
US GPE
Florida GPE
one meter QUANTITY
four decades DATE
Greenland GPE
2000 DATE
Howat PERSON
200 CARDINAL
Greenland GPE
Greenland Ice GPE
first ORDINAL
Howat PERSON
first ORDINAL
the United Nations Intergovernmental Panel on Climate Change ORG
the previous 15 years DATE
0.09 degrees QUANTITY
Fahrenheit PERSON
0.8 degrees QUANTITY
about 90% PERCENT
one CARDINAL
Arctic LOC
Antarctic LOC
two CARDINAL
one CARDINAL
Chinese NORP
January 2014 DATE
Global and Planetary Change ORG
U.S. GPE
May 2013 DATE
Coastal Engineering ORG
last March DATE
Nature WORK_OF_ART
1982 DATE
U.S. GPE
the period 1900-2013 DATE
U.N. ORG
Lima GPE

Peru GPE
December DATE
Hagupit PERSON
Philippines GPE
at least 21 CARDINAL
more than a million CARDINAL
Philippines GPE
1950 DATE
2012 DATE
the American Meteorological Society's Journal of Climate ORG
The hottest year DATE
East Coast LOC
Southwest LOC
California GPE
more than 150 years DATE
the Little Ice Age GPE
three-quarters CARDINAL
Fahrenheit WORK_OF_ART
between 1910 DATE
World War II EVENT
the mid-1970s DATE
the late '90s DATE
earlier in the century DATE
last June DATE
the late 1990s DATE
about 60 CARDINAL
last summer DATE
the National Oceanic and Atmospheric Administration ORG
NOAA ORG
the late 1970s DATE
John J. Kennedy PERSON
Jan. 24, 2014 DATE
Reviews of Geophysics ORG
NOAA ORG
the past several years DATE
West Antarctica LOC
Walter Munk PERSON
1915-45 DATE
approximately 0.5 degree Celsius QUANTITY
1.8 CARDINAL
1990 DATE
Andrew S. Trupin PERSON
John Wahr PERSON
over a century DATE
U.S. GPE
U.S. GPE
almost 70% PERCENT
between 1970 and 2014 DATE
about two pounds QUANTITY
the next century DATE

as much as one CARDINAL
1.8 degrees QUANTITY
Ayush PERSON
the Constitution Day DATE
14th April, 2020 DATE
Tulsi PERSON
4 CARDINAL
Dalchini PERSON
2 CARDINAL
Zingiber PERSON
Rhizome 2 PRODUCT
Krishna Marich PERSON
1 CARDINAL
2 CARDINAL
Ayurvedic Pharmacopoeia PERSON
3 grams QUANTITY
500 mg QUANTITY
150 ml QUANTITY
Draksha PERSON
Resins ORG
Lemon Juice ORG
3 CARDINAL
4. CARDINAL
Ayurveda / Siddha /Unani ORG
Drugs & Cosmetics Rules ORG
1945 DATE
States GPE
All State/UT Licensing Authorities and Drug Controllers WORK_OF_ART
ASU Drug Manufacturers ORG
Rotterdam GPE
first ORDINAL
10% PERCENT
the year 2100 DATE
10% PERCENT
100 years DATE
0.1 CARDINAL
more than 0.1 CARDINAL
10% PERCENT
100 years DATE
The American South ORG
Southern Canada ORG
a century DATE
Miami GPE
Dutch NORP
Rotterdam GPE
today DATE
winters DATE
the 2030s DATE
the late 17th century DATE
nearly half CARDINAL

Just 31% PERCENT
British NORP
King's College London's ORG
Labour ORG
Tory NORP
39% PERCENT
Labour ORG
this week DATE
5% PERCENT
British NORP
Conservative GPE
Labour ORG
Brexit PERSON
Boris Johnson's PERSON
1945 DATE
Bobby Duffy PERSON
Ipsos Mori PERSON
13% PERCENT
A quarter CARDINAL
Covid PERSON
67% PERCENT
Brexit PERSON
two-thirds CARDINAL
Labour ORG
only one CARDINAL
five CARDINAL
Conservative NORP
82% PERCENT
Labour ORG
Britain GPE
just 53% PERCENT
Conservative NORP
just 48% PERCENT
62% PERCENT
one CARDINAL
Some 61% PERCENT
Paul Johnson PERSON
IFS ORG
Deaton Review of Inequalities ORG
Burnley PERSON
London GPE
Johnson PERSON
Burnley ORG
Twickenham GPE
Twickenham GPE
Conservative NORP
Labour ORG
Labour ORG
Paul Johnson PERSON
Tony Blair PERSON

Blair PERSON
Keir Starmer PERSON
1970s DATE
Britain GPE
1975 DATE
More than half CARDINAL
the 1970s DATE
only 23% PERCENT
A&E ORG
GP ORG
As many as 56% PERCENT
England GPE
A&E ORG
the UK Lung Cancer Coalition ORG
five CARDINAL
a year DATE
GP LAW
NHS ORG
A&E ORG
More than a third CARDINAL
GP three or LAW
UK GPE
Lung PERSON
third ORDINAL
UK GPE
35,000 CARDINAL
A&E ORG
UK GPE
Prof Mick Peake PERSON
Peake ORG
the Centre for Cancer Outcomes at University College Hospital London
ORG
only one CARDINAL
Britain GPE
Peake PERSON
CT ORG
NHS ORG
Peake ORG
Tower Hamlets ORG
London GPE
A&E ORG
56.2% PERCENT
Manchester GPE
56.1% PERCENT
Leeds south PERSON
54% PERCENT
More than 50% PERCENT
A&E ORG
Salford GPE
Hull GPE

South Tyneside GPE
Sunderland GPE
only 14.7% PERCENT
Guildford GPE
Waverley PERSON
Surrey PERSON
Wokingham GPE
Berkshire GPE
15.7% PERCENT
Harrogate PERSON
16% PERCENT
Moira Fraser-Pearce PERSON
Macmillan Cancer Support ORG
NHS ORG
Macmillan ORG
NHS England ORG
NHS ORG
NHS ORG
Targeted NORP
thousands CARDINAL
NHS England ORG
three CARDINAL
four CARDINAL
2028 DATE
57% PERCENT
more than 55 CARDINAL
first ORDINAL
100 CARDINAL
this month DATE
Email FAC
Tory NORP
Philip Davies ORG
the Ministry of Justice ORG
less than six months DATE
56.6 CARDINAL
60.4 CARDINAL
last year DATE
one CARDINAL
93 CARDINAL
first ORDINAL
2018 DATE
at least two CARDINAL
first ORDINAL
more than 100 CARDINAL
the Police National Computer ORG
UK GPE
Mr Davies ORG
Democrat NORP
Layla Moran PERSON
Government ORG

Andrew Neilson PERSON
the Howard League for Penal ORG
Justice ORG
The Labour Party ORG
£30 billion MONEY
the Department of Health and Social Care ORG
the Labour Party ORG
Keir Starmer PERSON
Derby GPE
this morning TIME
Thursday DATE
Budget ORG
day DATE
the Department of Health and Social Care ORG
£30.1 billion MONEY
April this year DATE
the Labour Party ORG
more than 18 weeks DATE
over 500% PERCENT
the last decade DATE
Almost a quarter DATE
million CARDINAL
more than a year DATE
An estimated 4.59 million CARDINAL
more than 18 weeks DATE
the previous nine years DATE
over 720,000 CARDINAL
December 2019 DATE
Only 68% PERCENT
18 weeks DATE
92% PERCENT
18 weeks DATE
2016 DATE
NHS England LOC
£147.7 billion MONEY
this year DATE
£139.1 billion MONEY
NHS ORG
Covid GPE
November DATE
the Health Foundation ORG
around £2 billion MONEY
the next three years DATE
Jonathan Ashworth PERSON
Shadow Health and Social Care ORG
NHS ORG
Yesterday's Budget WORK_OF_ART
the Mental Health Taskforce ORG
Paul Farmer PERSON
2021 DATE

70,000 CARDINAL
30,000 CARDINAL
25% PERCENT
10% PERCENT
Health ORG
Jeremy Hunt PERSON
7 day DATE
first ORDINAL
One CARDINAL
4 CARDINAL
NHS ORG
£105 billion MONEY
every year DATE
2010 DATE
NHS ORG
£11.7 billion MONEY
last year DATE
first ORDINAL
£1.4 billion MONEY
Alistair Burt PERSON
More than four million CARDINAL
HM Revenue & Customs ORG
More than one CARDINAL
10 CARDINAL
just over one CARDINAL
20 CARDINAL
a year ago DATE
millions CARDINAL
14 per cent MONEY
more than 10 minutes TIME
an extra four minutes TIME
September DATE
the month DATE
one CARDINAL
five CARDINAL
more than 10 minutes TIME
5.5 per cent MONEY
five years Children DATE
11 CARDINAL
Times ORG
a third CARDINAL
under 18 DATE
Times ORG
2012 DATE
Hampshire PERSON
11-year-old DATE
two CARDINAL
12-year-olds DATE
Avon PERSON
Somerset PERSON

```
11-year-old DATE
11-year-olds DATE
West Midlands GPE
South Wales GPE
Buy Isa ORG
Friday DATE
first ORDINAL
More than 500,000 CARDINAL
George Osborne PERSON
Friday DATE
25 per cent MONEY
Robin Williams PERSON
Last week DATE
Home Office ORG
a decade DATE
Nearly 9 per cent MONEY
16 to CARDINAL
24-year-olds DATE
the past 12 months DATE
Britain GPE
Europe LOC
Robin Williams PERSON
Last week DATE
Home Office ORG
a decade DATE
Nearly 9 per cent MONEY
16 to CARDINAL
24-year-olds DATE
the past 12 months DATE
Britain GPE
Europe LOC
```

On applique ici la fonction add_entity_name sur la colonne text pour rajouter les entités nommées

```python
dftrain['text'] = dftrain['text'].astype(str)
print(dftrain.shape)

# Appliquer la fonction à la colonne "title"
dftrain['text'] = dftrain['text'].apply(add_entity_name)

print(dftrain['text'])

(2528, 4)
0      Distracted driving causes more deaths in Canad...
1      Missouri (GPE) politicians have made statement...
2      Home Alone 2 : Lost in New (GPE) York (GPE) is...
3      But things took a turn for the worse when riot...
4      It 's no secret that Epstein (PRODUCT) and Sch...
```

```
                                      ...
2523        More (CARDINAL) than (CARDINAL) four (CARDINAL...
2524        More under-18s are being taken to court for se...
2525        The Government 's much vaunted Help to Buy (OR...
2526        The late Robin (PERSON) Williams (PERSON) once...
2527        The late Robin (PERSON) Williams (PERSON) once...
Name: text, Length: 2528, dtype: object
```

On séléctionne les colonnes où on a que TRUE ou bien FALSE

```
dftraintf=dftrain
dftraintf= dftraintf.loc[dftraintf['rating'].isin(['TRUE','FALSE'])]
print(dftrain.shape)
print(dftraintf.shape)
y=dftraintf.iloc[0:,-2]
print(y)
```

```
(2528, 4)
(1578, 4)
0           You Can Be Fined $1,500 If Your Passenger Is U...
3           Obama's Daughters Caught on Camera Burning US ...
4           Leaked Visitor Logs Reveal Schiff's 78 Visits ...
6           FDA Shocking Study: Cells Used In Vaccines Con...
7           Israel Hits Beirut with Nuclear Missile, Trump...
                                   ...
2523        Taxman fails to answer four million calls a ye...
2524        Police catch 11-year-olds being used to sell d...
2525        Help to Buy Isa scandal: 500,000 first-time bu...
2526                 A coke-snorting generation of hypocrites
2527                 A coke-snorting generation of hypocrites
Name: title, Length: 1578, dtype: object
```

Le jeu de données étant déséquilibré, on a pensé à appliquer le downsampling pour
équilibrer nos données. on séléctionne des lignes aléatoirement de FALSE de telle sorte que
le nombre de lignes de FALSE soit = au nbr de lignes de TRUE. et on mélange le DataFrame.

```
# Compter le nombre d'observations dans chaque catégorie
df_true = dftraintf[dftraintf['rating']=="TRUE"]
df_false = dftraintf[dftraintf['rating']=="FALSE"]

# Sous-échantillonner la classe majoritaire (FALSE) pour obtenir un
nombre égal d'échantillons pour chaque classe
df_false_subsampled = df_false.sample(n=len(df_true), random_state=42)

# Concaténer les deux dataframes
dftraintf = pd.concat([df_false_subsampled, df_true])

# Mélanger aléatoirement les données
dftraintf = dftraintf.sample(frac=1, random_state=42)
```

```python
print(dftraintf)
X_text=dftraintf["text"]
X_title=dftraintf["title"]
print("La taille de X_text",X_text.shape)
y=dftraintf.iloc[0:,-1]
print(y.shape)
print("\n")
print("la taille de y est " ,y.shape)
print("\n")
print("les valeurs de TRUE et FALSE maintenant sont
" ,y.value_counts())
```

```
             id                                    text  \
615    f85ea242  It 's been a long time coming , but finally we...
1303   684c9ba4  Constitutional Attorney Matthew (PERSON) DePer...
1232   6c88493a  The (GPE) United (GPE) States (GPE) is witness...
2022   2aac10a5  After three (DATE) decades (DATE) on the bench...
287    1e83af88  Based on actual results and accounting for sta...
...         ...                                     ...
1006   0de76e26  5 (MONEY) Million (MONEY) Muslim (MONEY) Child...
1543   3886ead8  The bombshell claim comes from over (TIME) 20 ...
853    8e197ce3  BILL (ORG) GATES (ORG) EXPLAINS (ORG) THAT (OR...
296    01ed1b22  Let our journalists help you make sense of the...
1325   31d33510  Though the whole world relies on RT (ORG) - (O...

                                                 title rating
615    JK Rowling Confirms Stance Against Transgender...   TRUE
1303   MI Sec of State Official Caught On Video Telli...  FALSE
1232   What science can tell us about the links betwe...   TRUE
2022          Sarah Parker leaves legacy on Supreme Court   TRUE
287    Current Actual Election Result Update: Preside...  FALSE
...                                                  ...    ...
1006   Re: Meeting the need for isolation space for h...  FALSE
1543   Breaking: Breonna Taylor's boyfriend says SHE ...  FALSE
853    A quote from Politifact: Gates never said that...  FALSE
296    Before This Election, Newt Gingrich Believed t...   TRUE
1325    COVID19 PCR Tests are Scientifically Meaningless  FALSE

[844 rows x 4 columns]
La taille de X_text (844,)
(844,)


la taille de y est  (844,)


les valeurs de TRUE et FALSE maintenant sont  TRUE     422
```

```
FALSE    422
Name: rating, dtype: int64
```

On split notre jeu de données en jeu d'apprentissage et de test (20% pour le test)

```python
X=dftraintf['text']
print(X)

X_train,X_test_1,y_train,y_test=train_test_split(X,y,test_size =
0.2,random_state=8)
print("X_train is",X_train)
print("y_train is",y_train)
print("X_test is",X_test_1)
print("y_test is",y_test)
y_test_1=y_test
```

```
615     It 's been a long time coming , but finally we...
1303    Constitutional Attorney Matthew (PERSON) DePer...
1232    The (GPE) United (GPE) States (GPE) is witness...
2022    After three (DATE) decades (DATE) on the bench...
287     Based on actual results and accounting for sta...
                          ...
1006    5 (MONEY) Million (MONEY) Muslim (MONEY) Child...
1543    The bombshell claim comes from over (TIME) 20 ...
853     BILL (ORG) GATES (ORG) EXPLAINS (ORG) THAT (OR...
296     Let our journalists help you make sense of the...
1325    Though the whole world relies on RT (ORG) - (O...
Name: text, Length: 844, dtype: object
X_train is 1867    ( CNN (ORG) ) From the moment a child is born ...
1540    During the (ORG) Republican (ORG) National (OR...
2495    A large research synthesis , published in one ...
1197    Global warming could be far worse than predict...
788     Nearly (CARDINAL) 40,000 (CARDINAL) Wisconsini...
                          ...
2224    TIJUANA , Mexico (GPE) — It 's the image from ...
2424    The scale of Antarctica (LOC) is startling . M...
2038    An 18 (DATE) - (DATE) year (DATE) - (DATE) old...
1295    It is absolutely right that across this House ...
1890    Justine (PERSON) Greening (PERSON) resigned fr...
Name: text, Length: 675, dtype: object
y_train is 1867    TRUE
1540    FALSE
2495    TRUE
1197    TRUE
788     TRUE
           ...
2224    TRUE
2424    TRUE
2038    TRUE
1295    TRUE
1890    TRUE
```

```
Name: rating, Length: 675, dtype: object
X_test is 360      Then - Secretary of State (ORG) Hillary (PERSO...
1216    Story highlights Global (LOC) sea (LOC) level ...
2466    Australia (GPE) 's Great (WORK_OF_ART) Barrier...
1757    News| [ email protected ] " If you wo n't lead...
1387    For once , it 's not President Trump (PERSON) ...
                         ...
2435    The oldest and thickest sea ice in the Arctic ...
523     A coalition of civil society groups has descri...
2127    A coalition of civil society groups has descri...
247     With merchants in Democrat (NORP) - run cities...
615     It 's been a long time coming , but finally we...
Name: text, Length: 169, dtype: object
y_test is 360      TRUE
1216     TRUE
2466     TRUE
1757    FALSE
1387    FALSE
         ...
2435     TRUE
523      TRUE
2127     TRUE
247     FALSE
615      TRUE
Name: rating, Length: 169, dtype: object
```

On applique le pipeline du meilleur classifieur trouvé sur le X_train et le y_train

```
# création du pipeline en ajoutant le classifier
pipe = Pipeline([('cleaner',
TextNormalizer(removestopwords=True,lowercase=True,

getstemmer=True,removedigit=False)),
                 ('tfidf_vectorizer',
TfidfVectorizer(lowercase=False)),
                 ("SVM", SVC(C=2, gamma='scale', kernel='rbf',
random_state=42))])


pipetexte=pipe.fit(X_train,y_train)
print("à présent",y)

#save pipe
print("pipeline créé")

à présent 615      TRUE
1303    FALSE
1232     TRUE
2022     TRUE
287     FALSE
```

```
          ...
1006     FALSE
1543     FALSE
853      FALSE
296       TRUE
1325     FALSE
Name: rating, Length: 844, dtype: object
pipeline créé
```

On predict et on affiche le classification report et la matrice de confusion

```
y_pred_1=pipetexte.predict(X_test_1)
MyshowAllScores(y_test,y_pred_1)

Accuracy : 0.941
Classification Report
              precision    recall  f1-score   support

       FALSE    0.92941   0.95181   0.94048        83
        TRUE    0.95238   0.93023   0.94118        86

    accuracy                        0.94083       169
   macro avg    0.94090   0.94102   0.94083       169
weighted avg    0.94110   0.94083   0.94083       169
```
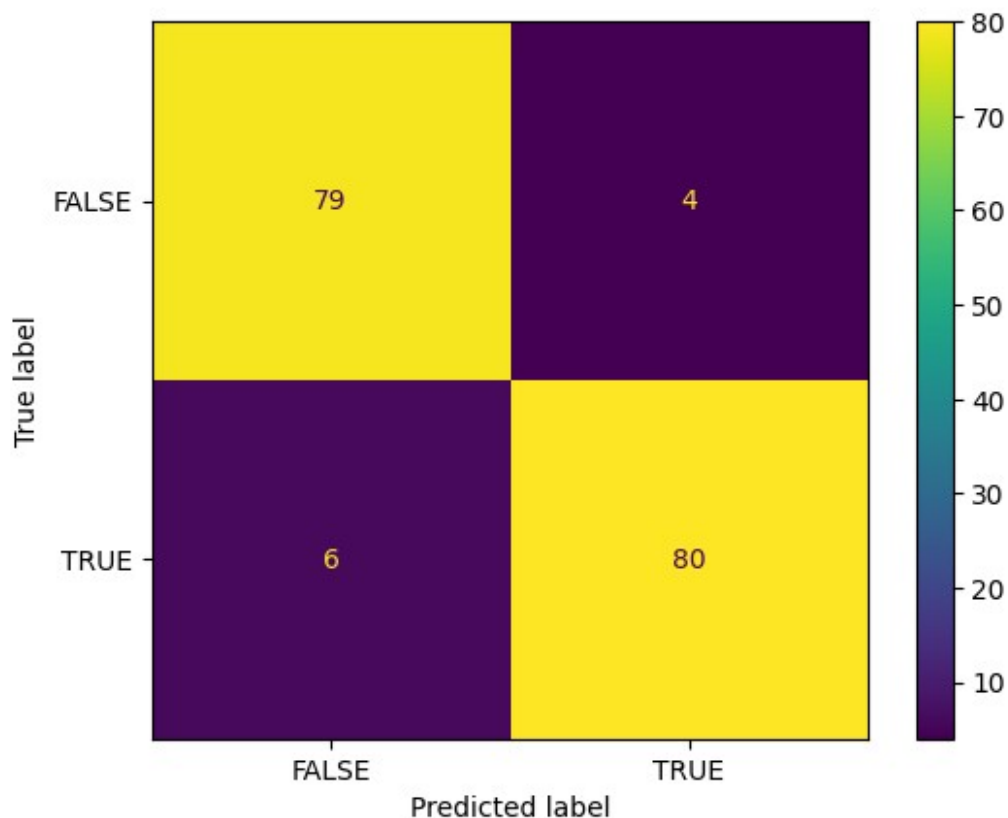
###Visualisation :

On trace la répartition de nos données selon le label TRUE et FALSE, on affiche la vraie répartition ici (y_test = ce qu'on était censés avoir)

```python
from sklearn.decomposition import TruncatedSVD
import plotly.express as px
from sklearn.manifold import TSNE
# Umap
import umap.plot
from umap import UMAP

X_test_copy = X_test_1.copy()

tfidf=TfidfVectorizer()
vector_tfidf=tfidf.fit_transform(X_test_copy)

# 2D
umap = UMAP(n_components=2, init='random', random_state=0)
projection = umap.fit_transform(vector_tfidf)

fig = px.scatter(
    projection, x=0, y=1,
    color=y_test, labels={'color': 'RATING'},
    color_discrete_sequence=['#FF0000', '#0000FF'])

fig.show()
```

On affiche la répartition qu'on predit (y_pred)

```python
# 2D
umap = UMAP(n_components=2, init='random', random_state=0)
projection = umap.fit_transform(vector_tfidf)


fig = px.scatter(
    projection, x=0, y=1,
    color=y_pred_1, labels={'color': 'RATING'},
    color_discrete_sequence=['#0000FF','#FF0000'])

fig.show()
```

Etape 3 : La deuxième classification selon True/False et Other (sur la colonne texte et titre combinés) avec les entités nommées

On applique ici la fonction add_entity_name sur la colonne titre pour rajouter les entités nommées

```python
dftrain['title'] = dftrain['title'].astype(str)
```

```python
# Appliquer la fonction à la colonne "title"
dftrain['title'] = dftrain['title'].apply(add_entity_name)
print(dftrain.head())
```

```
         id                                          text  \
0  5a228e0e  Distracted driving causes more deaths in Canad...
1  30c605a1  Missouri (GPE) politicians have made statement...
2  c3dea290  Home Alone 2 : Lost in New (GPE) York (GPE) is...
3  f14e8eb6  But things took a turn for the worse when riot...
4  faf024d6  It 's no secret that Epstein (PRODUCT) and Sch...


                                               title   rating
0  You Can Be Fined $ 1,500 (MONEY) If Your Passe...    FALSE
1  Missouri (GPE) lawmakers condemn Las (GPE) Veg...  mixture
2  CBC Cuts Donald (PERSON) Trump (PERSON) 's (PE...  mixture
3  Obama (ORG) 's (ORG) Daughters (ORG) Caught (O...    FALSE
4  Leaked Visitor Logs Reveal Schiff 's 78 (CARDI...    FALSE
```

- On concatène les deux colonnes text et titre pour appliquer la classification
- On séléctionne que les lignes où on a TRUE, FALSE et OTHER
- On crée une colonne regrouped qui va être soit TRUE/FALSE si la valeur dans rating est soit TRUE soit FALSE sinon OTHER

```python
dftrain3=dftrain
dftrain3['text_title'] = dftrain3[['text', 'title']].apply(lambda x:
'-'.join(x), axis=1)
dftrain3 = dftrain3.loc[dftrain3['rating'].isin(['TRUE','FALSE',
'other'])]

#On crée une colonne regroupe qui va mettre dans les lignes là où a
true ou bien false la valeur TRUE/FALSE et OTHER ça laisse
dftrain3['regrouped'] = dftrain3['rating'].apply(lambda x:'TRUE/FALSE'
if x in ['TRUE', 'FALSE'] else 'other')

X_text_title=dftrain3['text_title']
#print(X_text_title)
X_text_title.reset_index(drop = True, inplace = True)
print(dftrain3)
```

```
            id                                          text  \
0     5a228e0e  Distracted driving causes more deaths in Canad...
3     f14e8eb6  But things took a turn for the worse when riot...
4     faf024d6  It 's no secret that Epstein (PRODUCT) and Sch...
5     c03ed5db  Nation    UPDATED 8:23 (TIME) PM (TIME) - K A B...
6     61bd9a69  November (DATE) 23 (DATE) , (DATE) 2019 (DATE)...
...        ...                                           ...
2523  47423bb6  More (CARDINAL) than (CARDINAL) four (CARDINAL...
2524  097c142a  More under-18s are being taken to court for se...
2525  08bc59f4  The Government 's much vaunted Help to Buy (OR...
2526  af3393ce  The late Robin (PERSON) Williams (PERSON) once...
2527  a39d07df  The late Robin (PERSON) Williams (PERSON) once...
```

```
                                                        title rating  \
0          You Can Be Fined $ 1,500 (MONEY) If Your Passe...  FALSE
3          Obama (ORG) 's (ORG) Daughters (ORG) Caught (O...  FALSE
4          Leaked Visitor Logs Reveal Schiff 's 78 (CARDI...  FALSE
5          K A B O O M ! Governor and Secretary of State ...  other
6          FDA (ORG) Shocking (ORG) Study (ORG) : (ORG) C...  FALSE
...                                                      ...    ...
2523       Taxman fails to answer four (CARDINAL) million...   TRUE
2524       Police catch 11-year-olds (ORDINAL) being used...   TRUE
2525       Help to Buy (ORG) Isa (ORG) scandal : 500,000 ...  FALSE
2526               A coke - snorting generation of hypocrites   TRUE
2527               A coke - snorting generation of hypocrites   TRUE

                                              text_title  regrouped
0          Distracted driving causes more deaths in Canad...  TRUE/FALSE
3          But things took a turn for the worse when riot...  TRUE/FALSE
4          It 's no secret that Epstein (PRODUCT) and Sch...  TRUE/FALSE
5          Nation   UPDATED 8:23 (TIME) PM (TIME) - K A B...      other
6          November (DATE) 23 (DATE) , (DATE) 2019 (DATE)...  TRUE/FALSE
...                                                      ...        ...
2523       More (CARDINAL) than (CARDINAL) four (CARDINAL...  TRUE/FALSE
2524       More under-18s are being taken to court for se...  TRUE/FALSE
2525       The Government 's much vaunted Help to Buy (OR...  TRUE/FALSE
2526       The late Robin (PERSON) Williams (PERSON) once...  TRUE/FALSE
2527       The late Robin (PERSON) Williams (PERSON) once...  TRUE/FALSE

[1812 rows x 6 columns]

<ipython-input-163-b38ef8f57fac>:6: SettingWithCopyWarning:


A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation:
https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#
returning-a-view-versus-a-copy
```

Le jeu de données étant déséquilibré, on a pensé à appliquer le downsampling pour
équilibrer nos données. on séléctionne des lignes aléatoirement de TRUE/FALSE de telle
sorte que le nombre de lignes de TRUE/FALSE soit = au nbr de lignes de OTHER. et on
mélange le DataFrame.

```python
# Séparer les classes en deux dataframes
df_false_true = dftrain3[dftrain3['regrouped'] == 'TRUE/FALSE']
df_other = dftrain3 [dftrain3['regrouped'] == 'other']

# Sous-échantillonner la classe majoritaire (FALSE) pour obtenir un
```

```python
nombre égal d'échantillons pour chaque classe
df_subsampled = df_false_true.sample(n=len(df_other), random_state=42)

# Concaténer les deux dataframes
dftrain3 = pd.concat([df_subsampled, df_other])
print(dftrain3)
# Mélanger aléatoirement les données
dftrain3 = dftrain3.sample(frac=1, random_state=42)
y=dftrain3['regrouped']
print(X_text_title.shape)
print(y.value_counts())
```

```
           id                                               text  \
1889  c57f8234  People with lung cancer are dying after being ...
1299  b5bf9ed6  Update 1040ET (CARDINAL) : Science moves fast ...
1788  57d407f9  The majority of Britons (GPE) say the police h...
781   94c9b8ce  Dr. Kemi (PERSON) Olunloye (PERSON) , a traine...
748   83ac5f2a  Mike (PERSON) Bloomberg (PERSON) has been plun...
...        ...                                                ...
2389  44d974ca  The announcement follows the publication of a ...
2412  716a397b  Millennials are on track to become the first (...
2464  d17185d3  Like what ?   Helen (PERSON) Harwatt (PERSON) ...
2489  3a90d9c8  The dramatic melting of Arctic (LOC) ice is al...
2522  39f5c37f  The announcement follows the publication of a ...

                                                  title rating  \
1889  A team of scientists from Canada (GPE) have id...  FALSE
1299  Coronavirus (ORG) Contains (ORG) HIV (ORG) Ins...  FALSE
1788  MSM (ORG) link Italy (GPE) neo - Nazi (NORP) w...   TRUE
781   China (GPE) , the (ORG) World (ORG) Health (OR...  FALSE
748   Bloomberg (PERSON) plunges into new controvers...   TRUE
...                                                 ...    ...
2389          New investment in mental health services  other
2412  Why insecure millennials are set for unhealthy...  other
2464  If Everyone Ate Beans Instead of Beef (WORK_OF...  other
2489  Arctic (LOC) ice melt ' already affecting weat...  other
2522          New investment in mental health services  other

                                             text_title   regrouped
1889  People with lung cancer are dying after being ...  TRUE/FALSE
1299  Update 1040ET (CARDINAL) : Science moves fast ...  TRUE/FALSE
1788  The majority of Britons (GPE) say the police h...  TRUE/FALSE
781   Dr. Kemi (PERSON) Olunloye (PERSON) , a traine...  TRUE/FALSE
748   Mike (PERSON) Bloomberg (PERSON) has been plun...  TRUE/FALSE
...                                                 ...         ...
2389  The announcement follows the publication of a ...       other
2412  Millennials are on track to become the first (...       other
2464  Like what ?   Helen (PERSON) Harwatt (PERSON) ...       other
2489  The dramatic melting of Arctic (LOC) ice is al...       other
2522  The announcement follows the publication of a ...       other
```

```
[468 rows x 6 columns]
(1812,)
TRUE/FALSE      234
other           234
Name: regrouped, dtype: int64
```

On scinde notre jeu de données en 80% jeu d'apprentissage et 20% de jeu de test

```
X=dftrain3["text_title"]
print(X)
```

```
X_train,X_test,y_train,y_test=train_test_split(X,y,test_size =
0.2,random_state=8)
print("X_train is",X_train.shape)
print("y_train is",y_train.shape)
print("X_test is",X_test.shape)
print("y_test is",y_test.shape)
```

```
947     War - torn eastern regions of Ukraine (GPE) ha...
2224    TIJUANA , Mexico (GPE) — It 's the image from ...
1307    Today , Congresswoman Maxine Waters D - CA , C...
798     Meghan (PERSON) Markle (PERSON) will use the f...
320     Further proof that Democrats (NORP) are the gr...
                            ...
1160    The scale of Antarctica (LOC) is startling . M...
570     Coronavirus (ORG) may be sexually transmitted ...
1200    Like what ?   Helen (PERSON) Harwatt (PERSON) ...
2190    Tumeric kills cancer not patient-Vermont (GPE)...
391      WASHINGTON (GPE) , DC — The Pentagon (ORG) has...
Name: text_title, Length: 468, dtype: object
X_train is (374,)
y_train is (374,)
X_test is (94,)
y_test is (94,)
```

On applique le pipeline du meilleur classifieur trouvé sur le X_train et le y_train

```
# création du pipeline en ajoutant le classifier
pipe = Pipeline([('cleaner',
TextNormalizer(removestopwords=True,lowercase=True,

getstemmer=False,removedigit=False)),
                 ('count_vectorizer',
CountVectorizer(lowercase=False)),
                 ("SVM", SVC(C=1, gamma=0.1, kernel='rbf',
random_state=42))])

pipetexte=pipe.fit(X_train,y_train)
```

```
print("à présent",y)

#save pipe
print("pipeline créé")
```

```
à présent 947      TRUE/FALSE
2224     TRUE/FALSE
1307     TRUE/FALSE
798          other
320      TRUE/FALSE
          ...
1160     TRUE/FALSE
570          other
1200         other
2190         other
391      TRUE/FALSE
Name: regrouped, Length: 468, dtype: object
pipeline créé
```

**On predict et on affiche le classification report et la matrice de confusion**

```
y_pred=pipetexte.predict(X_test)
MyshowAllScores(y_test,y_pred)
```

```
Accuracy : 0.936
Classification Report
             precision    recall  f1-score   support

   TRUE/FALSE    0.86957   1.00000   0.93023        40
        other    1.00000   0.88889   0.94118        54

     accuracy                        0.93617        94
    macro avg    0.93478   0.94444   0.93570        94
 weighted avg    0.94450   0.93617   0.93652        94
```
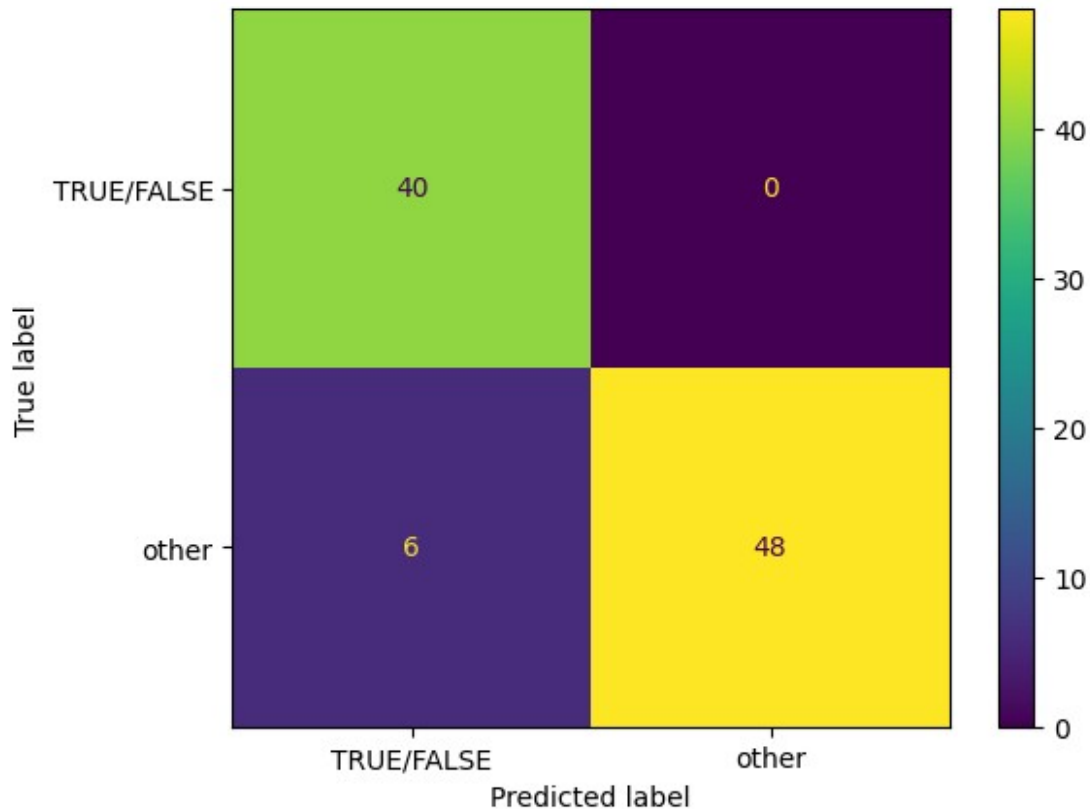
Visualisation:

On trace la répartition de nos données selon le label TRUE/FALSE et OTHER, on affiche la vraie répartition ici (y_test = ce qu'on était censés avoir)

```
X_test_copy = X_test.copy()

tfidf=TfidfVectorizer()
vector_tfidf=tfidf.fit_transform(X_test_copy)

# 2D
umap = UMAP(n_components=2, init='random', random_state=0)
projection = umap.fit_transform(vector_tfidf)

fig = px.scatter(
    projection, x=0, y=1,
    color=y_test, labels={'color': 'RATING'},
    color_discrete_sequence=['#FF0000', '#0000FF'])

fig.show()
```

On affiche la répartition qu'on predit (y_pred)

```
# 2D
umap = UMAP(n_components=2, init='random', random_state=0)
```

```
projection = umap.fit_transform(vector_tfidf)


fig = px.scatter(
    projection, x=0, y=1,
    color=y_pred, labels={'color': 'RATING'},
    color_discrete_sequence=['#FF0000', '#0000FF'])

fig.show()
```

Etape 4 : La troisième classification selon True/False/mixture/other (sur la colonne texte)

On a déjà fait la classification selon True et False , maintenat faisons celle selon mixture et other avec les meilleurs paramètres recueillis à partir des tests

On séléctionne que les lignes où on a OTHER ou MIXTURE

```
dftrain = dftrainbase.loc[dftrainbase['rating'].isin(['other',
'mixture'])]
y=dftrain.iloc[0:,-2]
print(y)
print("les valeurs de MIXTURE et OTHER maintenant sont
" ,y.value_counts())

1       mixture
2       mixture
5         other
10      mixture
13      mixture
          ...
2517    mixture
2518    mixture
2519    mixture
2520    mixture
2522      other
Name: rating, Length: 950, dtype: object
les valeurs de MIXTURE et OTHER maintenant sont  mixture     716
other       234
Name: rating, dtype: int64
```

Le jeu de données étant déséquilibré, on a pensé à appliquer le downsampling pour équilibrer nos données. on séléctionne des lignes aléatoirement de OTHER et MIXTURE de telle sorte que le nombre de lignes de OTHER ou MIXTURE soit = au nbr de lignes de la classe avec le plus petit nombre de lignes. et on mélange le DataFrame.

```
# Compter le nombre d'observations dans chaque catégorie
mixture_count = dftrain['rating'].value_counts()['mixture']
other_count = dftrain['rating'].value_counts()['other']
```

```python
# Trouver le nombre minimum d'observations parmi les catégories
min_count = min( mixture_count, other_count)

# Sous-échantillonner les catégories pour équilibrer les quantités
mixture_sampled = dftrain[dftrain['rating'] ==
'mixture'].sample(min_count, random_state=42)
other_sampled = dftrain[dftrain['rating'] ==
'other'].sample(min_count, random_state=42)


# Concaténer les échantillons pour obtenir un nouveau dataframe
équilibré
dftrain = pd.concat([mixture_sampled,other_sampled])

# Mélanger aléatoirement les données
dftrain = dftrain.sample(frac=1, random_state=42)
X_text=dftrain["text"]
X_title=dftrain["title"]
y=dftrain.iloc[0:,-2]
print("\n")
print("la taille de y_train est " ,y.shape)
print("\n")
print("les valeurs de OTHER et MIXTURE maintenant sont
" ,y.value_counts())
```

```
la taille de y_train est  (468,)


les valeurs de OTHER et MIXTURE maintenant sont  mixture    234
other       234
Name: rating, dtype: int64
```

On applique ici la fonction add_entity_name sur la colonne text pour rajouter les entités nommées

```python
dftrain['text'] = dftrain['text'].apply(add_entity_name)
```

On scinde notre jeu de données en 80% jeu d'apprentissage et 20% de jeu de test

```python
X=dftrain["text"]
print(X)

X_train,X_test,y_train,y_test=train_test_split(X,y,test_size =
0.2,random_state=8)
print("X_train is",X_train)
print("y_train is",y_train)
print("X_test is",X_test)
```

```python
print("y_test is",y_test)
y_test_2 = y_test
```

```
2236    For immediate release : For more information :...
2450    Despite recent attempts to paint the ( GPE ) U...
1802    RT (ORG) ( (ORG) ORG (ORG) ) (ORG) America (OR...
2359    A blitz on helping people with drink , drug an...
1931    From new funding to support veterans to reduci...
                            ...
1887    By Jim (PERSON) ( PERSON ) Francesconi ( PERSO...
1940    On Tuesday (DATE) ( DATE ) , radio show host J...
1837    EXCLUSIVE : Third (ORDINAL) ( ORDINAL ) of cas...
458     We all need to keep in mind that , except for ...
817     Aung (PERSON) ( GPE (ORG) ) San Suu Kyi Reside...
Name: text, Length: 468, dtype: object
X_train is 1057    The ( ORG ) NHS ( ORG ) Long ( ORG ) Term ( OR...
440     WASHINGTON (GPE) ( GPE (ORG) ) , DC — The ( OR...
1290    CONTACT : Bryan (PERSON) ( PERSON ) Kennedy (P...
1137    52 (PERCENT) ( (PERCENT) PERCENT (PERCENT) ) (...
1518    Cash - strapped schools are spending a record ...
                            ...
633     TALLAHASSEE (ORG) ( GPE (ORG) ) , Fla. (GPE) (...
2368    GETTY ( ORG ) Corbyn (PERSON) ( ORG (ORG) ) pr...
2111    Also on the naughty list were Christmas (DATE)...
164     WHATEVER drama plays out when Republicans (NOR...
1149    Where in the world do you think the following ...
Name: text, Length: 374, dtype: object
y_train is 1057       other
440     mixture
1290    mixture
1137    mixture
1518    mixture
           ...
633     mixture
2368    mixture
2111      other
164     mixture
1149    mixture
Name: rating, Length: 374, dtype: object
X_test is 208     This is one in a series of articles taken from...
2245    High earners in professional jobs , such as do...
263     Biden (PERSON) ( PERSON ) Has ( PERSON ) Been ...
2081    Aung (PERSON) ( GPE (ORG) ) San Suu Kyi Reside...
1046    By Jim (PERSON) ( PERSON ) Francesconi ( PERSO...
                            ...
1995    SHARE By of the Waukesha (GPE) ( GPE (ORG) ) -...
768     Bois (PERSON) ( ORG ) State ( ORG (ORG) ) (ORG...
941     It was an accurate and judicious answer , so n...
2385    L ondoners living in the borough of Greenwich ...
1269    Nation    UPDATED 8:23 ( TIME (ORG) ) PM ( TIM...
```

```
Name: text, Length: 94, dtype: object
y_test is 208          other
2245       other
263        other
2081    mixture
1046    mixture
         ...
1995    mixture
768        other
941        other
2385       other
1269       other
Name: rating, Length: 94, dtype: object
```

On applique le pipeline du meilleur classifieur trouvé sur le X_train et le y_train

```
# création du pipeline en ajoutant le classifier
pipe =  Pipeline ([('cleaner', TextNormalizer()),
                    ('tfidf_vectorizer',
TfidfVectorizer(lowercase=False)),
                    ("SVM", SVC(C=2, gamma='scale', kernel='rbf',
random_state=42))])
pipetexte=pipe.fit(X_train,y_train)
print("à présent",y_train)

#save pipe
print("pipeline créé")
```

```
à présent 1057         other
440     mixture
1290    mixture
1137    mixture
1518    mixture
         ...
633     mixture
2368    mixture
2111       other
164     mixture
1149    mixture
Name: rating, Length: 374, dtype: object
pipeline créé
```

On predict et on affiche le classification report et la matrice de confusion

```
X_test_text=X_test
print(X_test_text)
y_pred_2=pipetexte.predict(X_test_text)
MyshowAllScores(y_test,y_pred_2)

208     This is one in a series of articles taken from...
2245    High earners in professional jobs , such as do...
```

```
263     Biden (PERSON) ( PERSON ) Has ( PERSON ) Been ...
2081    Aung (PERSON) ( GPE (ORG) ) San Suu Kyi Reside...
1046    By Jim (PERSON) ( PERSON ) Francesconi ( PERSO...
                         ...
1995    SHARE By of the Waukesha (GPE) ( GPE (ORG) ) -...
768     Bois (PERSON) ( ORG ) State ( ORG (ORG) ) (ORG...
941     It was an accurate and judicious answer , so n...
2385    L ondoners living in the borough of Greenwich ...
1269    Nation     UPDATED 8:23 ( TIME (ORG) ) PM ( TIM...
Name: text, Length: 94, dtype: object
Accuracy : 0.883
Classification Report
              precision     recall   f1-score    support

     mixture    0.82222    0.92500    0.87059         40
       other    0.93878    0.85185    0.89320         54

    accuracy                          0.88298         94
   macro avg    0.88050    0.88843    0.88190         94
weighted avg    0.88918    0.88298    0.88358         94
```
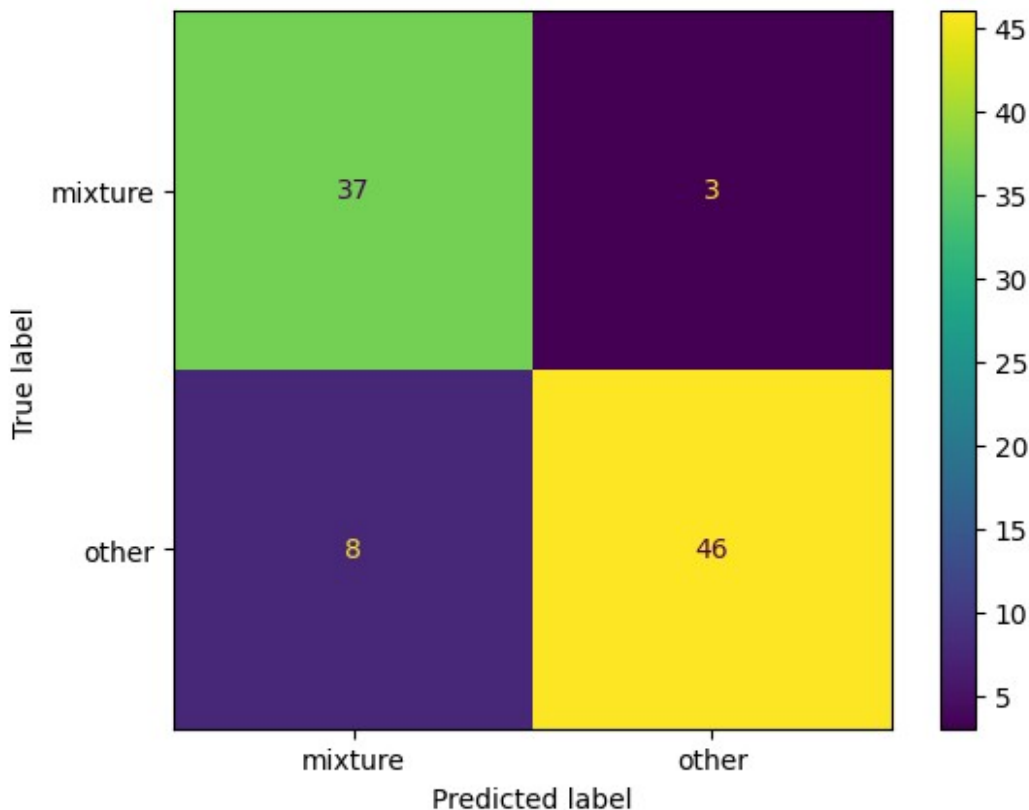

On concatène les deux y_test et y_pred des deux classifications TRUE vs FALSE et de OTHER vs MIXTURE pour pouvoir tracer la matrice de confusion et le classification report final

```
# Conversion de tableaux NumPy en objets Series Pandas
y_pred_1 = pd.Series(y_pred_1)
y_pred_2 = pd.Series(y_pred_2)
#concat
y_pred_final = pd.concat([y_pred_1, y_pred_2], ignore_index=True)
y_test_final = pd.concat([y_test_1, y_test_2], ignore_index=True)
#dernier test
MyshowAllScores(y_test_final,y_pred_final)
```

```
Accuracy : 0.920
Classification Report
              precision    recall  f1-score   support

       FALSE    0.92941   0.95181   0.94048        83
        TRUE    0.95238   0.93023   0.94118        86
     mixture    0.82222   0.92500   0.87059        40
       other    0.93878   0.85185   0.89320        54

    accuracy                        0.92015       263
   macro avg    0.91070   0.91472   0.91136       263
weighted avg    0.92254   0.92015   0.92037       263
```
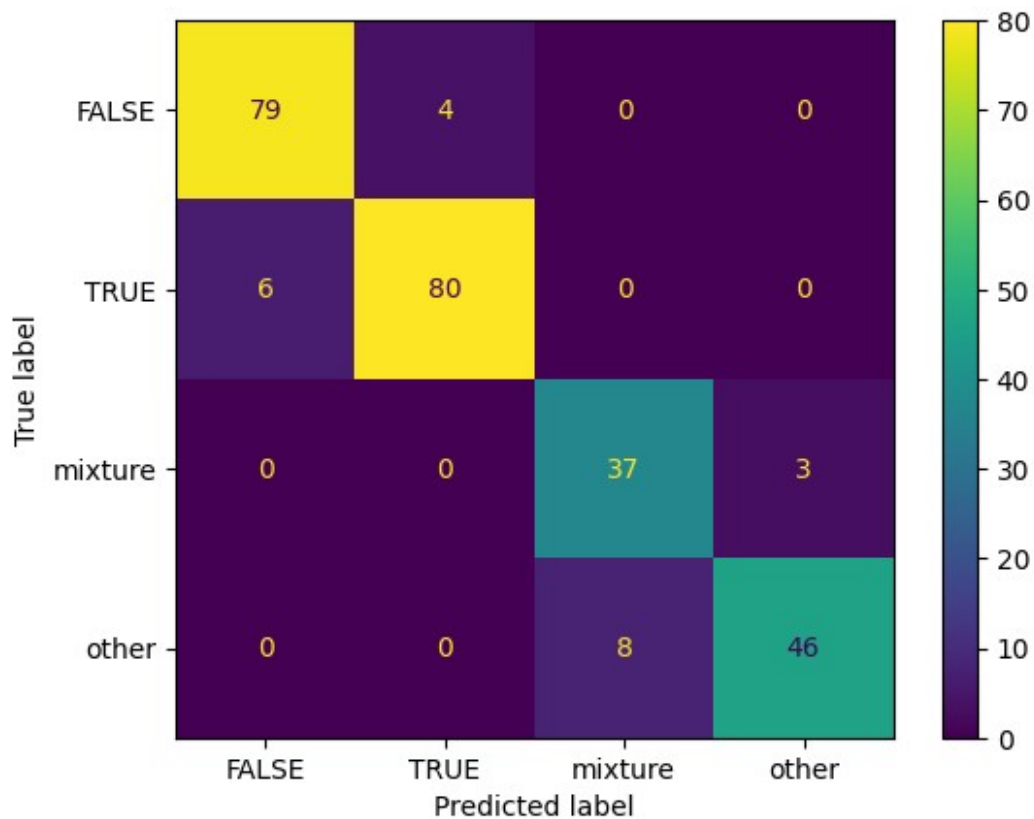

Visualisation:

- On trace la répartition de nos données selon le label TRUE ou FALSE ou OTHER ou MIXTURE, on affiche la vraie répartition ici (y_test = ce qu'on était censés avoir)
- Le X_test devient la combinaison des deux aussi

```python
X_test_copy = pd.concat([X_test_text, X_test_1], ignore_index=True)

tfidf=TfidfVectorizer()
vector_tfidf=tfidf.fit_transform(X_test_copy)

# 2D
umap = UMAP(n_components=2, init='random', random_state=0)
projection = umap.fit_transform(vector_tfidf)

fig = px.scatter(
    projection, x=0, y=1,
    color=y_test_final, labels={'color': 'RATING'},
    color_discrete_sequence=['#FF0000', '#0000FF'])

fig.show()
```

On affiche la répartition qu'on predit (y_pred)

```python
# 2D
umap = UMAP(n_components=2, init='random', random_state=0)
projection = umap.fit_transform(vector_tfidf)


fig = px.scatter(
    projection, x=0, y=1,
    color=y_pred_final, labels={'color': 'RATING'},
    color_discrete_sequence=['#0000FF','#FF0000'])

fig.show()
```