Willis Towers Watson challenges for University of Bath SAMBa ITT 2019

1) Attributing Frequencies to Windstorm Event Scenarios

Data

- Tropical cyclone track set – International Best Track Archive for Climate Stewardship (IBTrACS) https://www.ncdc.noaa.gov/ibtracs/ Can be accessed - csv file (~500MB), 200 columns, ~400k rows. Recently collected data appears more useful/precise
- Example hypothetical tracks and portfolios could be created beforehand, if useful.
- European windstorm data: http://www.europeanwindstorms.org/ with data for each storm treated in separate files from ~1980
- Natural hazard data available for tsunamis, earthquakes and volcanoes: https://www.ngdc.noaa.gov/hazard/

2) Towards Establishing a Volcanic Hazard Index (VHI)

Data:
- https://catalog.data.gov/dataset?tags=volcanoes Seems to have lists of US datasets on volcanoes.
- Volcanic eruption data available at: https://www.ngdc.noaa.gov/nndc/servlet/ShowDatasets?dataset=102557&search_look=50&display_look=50
  - Can be accessed - csv file (~500MB), 200 columns, ~400k rows. Recently collected data appears more useful/precise
- PEI by volcano: https://data.humdata.org/dataset/volcano-population-exposure-index-gvm/resource/e3b1ecf0-ec47-49f7-9011-6bbb7403ef6d
  - Population exposure index by volcano. Can be exported as a csv
- Evacuation Database: https://www.sciencedirect.com/science/article/pii/S0377027305001563#app1 says that: "The "live" database will be published online at the website of the International Volcanic Health Hazards Network (www.ivhhn.org) in due course." It doesn't appear to be available
- Database with GIS shape data for lava flows of a particular volcanic incident over time: https://www.sciencebase.gov/catalog/item/597230e4e4b0ec1a4885edc1
- Real-time Earth Observation data: https://volcanoes.usgs.gov/vhp/observatories.html
  - Open in chrome (not in Microsoft edge). At the top of the page, can "find a u.s. volcano" by drop down. Has any recent monitoring data, general volcano information (and how to pronounce it) and historical information. We haven't yet found a nice way to extract data sets

Other:[?]
- VEI/PEI data
- Evacuation Database
- Volcanoes of Concern
- Real-time Earth Observation data

3) Machine Learning Approaches to Parametric Insurance Applications

Data:

- **Water stress indicators:**
  - Normalized Difference Vegetation Index (NDVI) & Enhanced Vegetation Index (EVI): Data from the website https://resourcewatch.org/data/explore user guides suggests data for vegetation conditions, temperature and vegetation health from 1981. (we guess you can open .nc files with matlab)
  - Water Requirement Satisfaction Index (WRSI)
  - The World Resources Institute (WRI) 'Resource Watch' data platform https://resourcewatch.org/data/explore, for example:
    - Average aridity, calculated as the ratio of mean annual precipitation to mean annual potential evapotranspiration (source: CGIAR-CSI)
      - Data is available here, we couldn't open the files https://cgiarcsi.community/data/global-aridity-and-pet-database/
    - Standardised Precipitation-Evapotranspiration Index (source: CSIC)
    - Groundwater Vulnerability to Floods and Droughts (source: WHYMAP)
    - Global Croplands and Watering Source (source: ICRISAT)
    - Location and temporal distribution of global surface water from 1984 to 2015 (source: EC JRC)
    - Fragile States Index (source: FFP)
      - http://fundforpeace.org/fsi/excel/
    - International Water Event Database (source: OSU)
      - https://transboundarywaters.science.oregonstate.edu/content/data-and-datasets
    - Internal Displacement from Conflict and Natural Disasters (source: IDMC)
- **Conflict databases:**
  - Armed Conflict Location & Event Data Project (ACLED) data-set.
    - https://www.acleddata.com/data/
    - Data available on ACLED website as Excel spreadsheets. Highly unstructured (text descriptions of conflict events) - may be difficult to work with.
    - Disaggregated conflict collection with information on the dates, actors, types of violence, locations, and fatalities of all reported political violence and protest events across Africa, South Asia, South East Asia and the Middle East. Political violence and protest includes events that occur within civil wars and periods of instability, public protest and regime breakdown
    - Updated weekly
    - Africa records from 1997 to present day
  - Uppsala Conflict Data Program (UCDP)
    - UCDP data accessible via REST API (so can be downloaded directly into R, Python, etc.)
- **Climate data for weather indices:**
  - Station & gridded data: https://www.metoffice.gov.uk/climate/uk/data
  - Extreme weather index data: https://www.climdex.org/datasets.html