climada module drought fire 25 June 2017

https://github.com/davidnbresch/climada_module_drought_fire
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This module implements a method to generate a local bushfire model any place on the globe, using a cellular automat for the small-scale fires and based on satellite information for the large(r) scale events.

This module is planned to also provide a global drought model
(not implemented yet).

In essence, this module currently implements three approaches for bushfire

- Firms-data based historic fires → see `bf_generator_large`
- Cellular-automata generated fires → see `bf_TEST_small`
- Combined approach → see `bf_TEST_jumpy`

All details are documented in the headers of the respective routines (for the time being). See below for a brief guide about how to retrieve the FIRMS fire data.

This module is in TEST (very much beta) state. There are three relevant (higher level) codes, namely **`bf_generator_large('TEST')`**, **`bf_TEST_small`** and **`bf_TEST_jumpy`**.

Content

Bushfire based on FIRMS data

Based on satellite-observed fires, generate a purely historic hazard event set.

Figure: the region for which TEST data in Australia is available[1]. Obtained from https://firms.modaps.eosdis.nasa.gov/download . See bottom of this document for larger dataset(s).

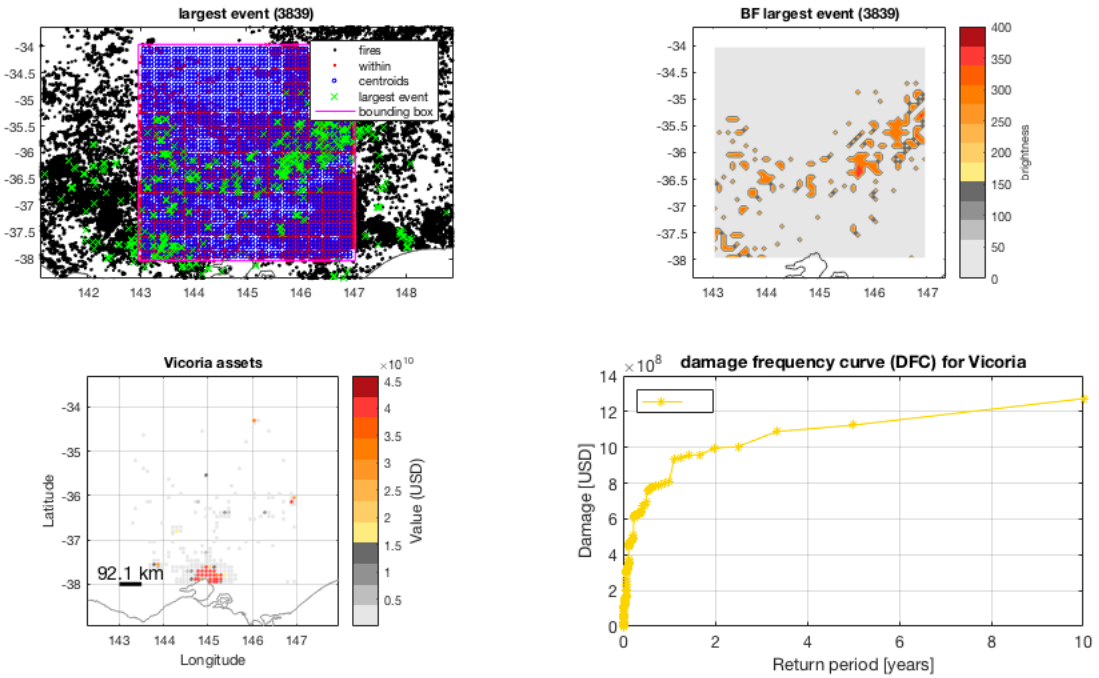

Figure: The result screen for TEST mode. Bushfire database on the top left and rendering of largest single event on the top right panel. Melbourne at the bottom center of the plots. Asset distribution in the lower left and resulting damage frequency curve (DFC) in the lower right panel. Generated by `hazard=bf_generator_large('TEST').`

[1] file firms.csv in the module's data/hazards/external_model_output folder.

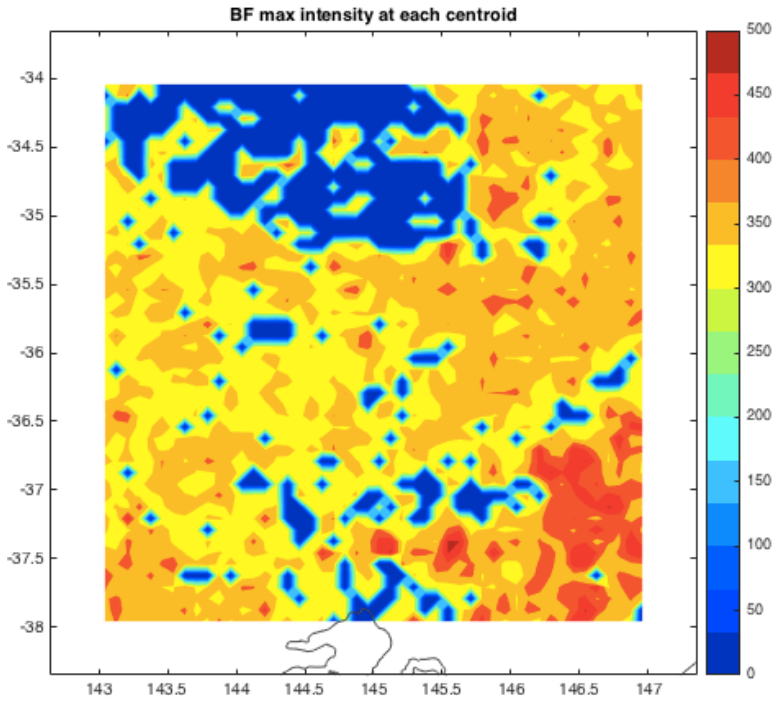

Figure: Maximum bushfire intensity at each centroid, based on the TEST data for Victoria (2006-2015). Melbourne at the bottom center of the plot. Plot generated by plotting `climada_hazard_plot(hazard,0)` after calling `hazard=bf_generator_large('TEST')`.

Cellular automat to generate (artificial) bushfires

See climada_bushfire_cellular.pdf for a brief introduction into this approach (by beuschl@student.ethz.ch, horatc@student.ethz.ch, 2016).

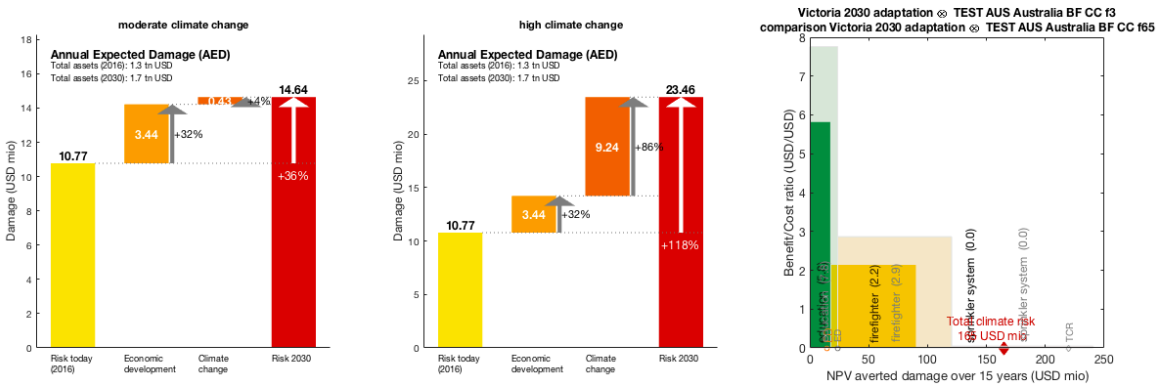

Figure: The results for the cellular automata approach (see climada_bushfire_cellular.pdf). Left and centre panels the waterfall charts for moderate and high climate change, right panel the adaptation cost curves for both moderate and high change (semi-transparent). Generated by `bf_TEST`.

Combined approach, cellular automat ‘seeded’ by historic bushfire record

Implementation of this combined approach by doerger@student.ethz.ch, dinah@student.ethz.ch, tschumie@student.ethz.ch, 2017.

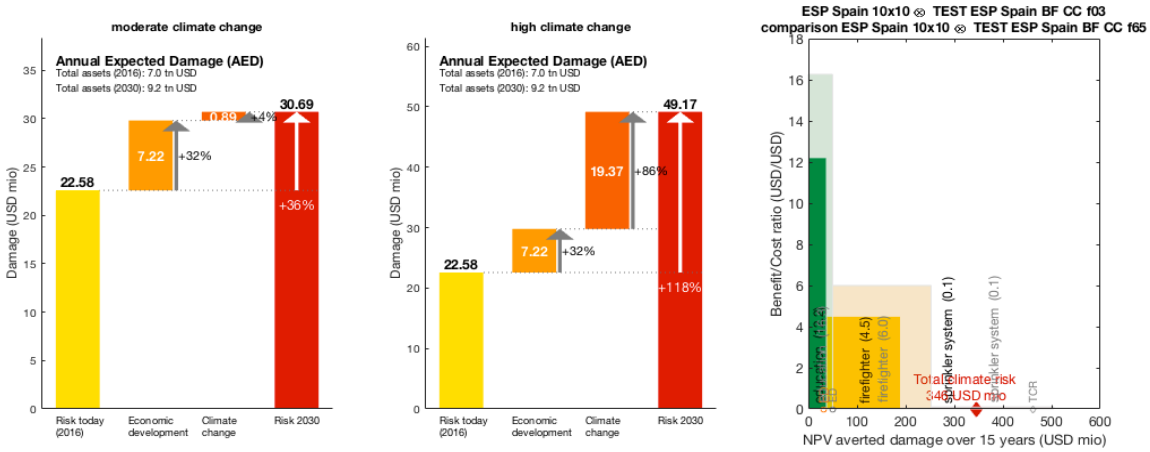

Figure: The result of `bf_TEST_jumpy` (Spain, based on data 2001-2016). See section “How to retrieve … data” below to obtain the latest FIRMS fire data (also for the example of Spain).

How to retrieve the FIRMS (MODIS/VIIRS) fire data

In order to retrieve the archived fire activity (since 2001) from the Fire Information for Resource Management System (FIRMS), please go to the Archive Download: https://firms.modaps.eosdis.nasa.gov/download. Select New request, create and switch to country selection and enter something like:

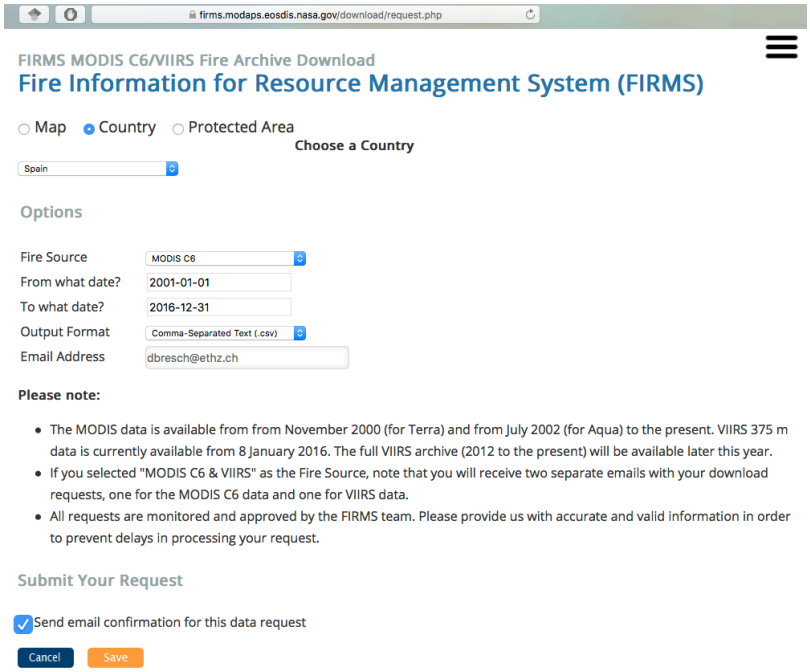

Figure: the download screen.

You might choose any time period, but full years (1 Jan – 31 Dec) are easier to process later (in terms of correct fire frequencies). For easy processing in climada, you might add the country ISO3 code to the file once downloaded, such as e.g. **ESP**_fire_archive_M6_13387.csv (ESP for Spain). Then invoke `firms=firms_read('',1)` in MATLAB and you get:

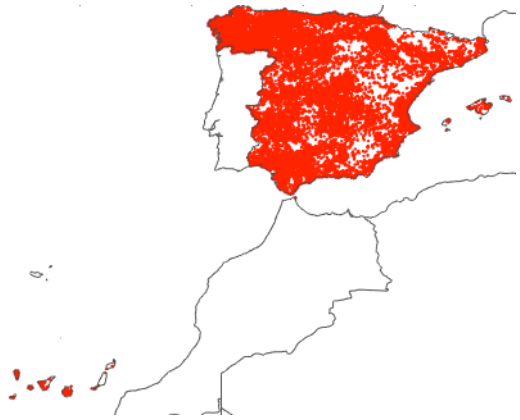

Figure: all fire locations in Spain for the data period 01-Jan-2001 22:07:00 ..31-Dec-2016 22:25:00, 16635 events (76880 records).