Exercise 2 – Deliverables

Presentations 30 May 2016

- Groups of max. three people
- 10 minutes (strict timing), ideally presented by the whole group, PowerPoint or not
- Exciting presentation with a clear take home message (assume everyone is familiar with the toy and climada model and with all discussed so far)
- Show us one interesting/new/unexpected/important/exciting aspect relevant to the problem.
- Criteria: Scientific content/accuracy (25%), relevance of content to the course (25%), timing/contributions from each person (25%), delivery/presentation (25%)

Possible topics

All topics shall focus on an aspect implemented in climada – and hence shall make (intense) use of the model framework, and document the work within this framework (provide code and data to reproduce results). All impacts shall be measured in economic terms[1] (dollars) and the **impact on the adaptation cost curve shall be the final result** (should be kind of the last slide of your presentation, see Appendix for an example how to show the effect of several assumptions on such a final adaptation cost curve):

- e.g. a change in wind model parameterization shall be quantified in terms of effect on a given portfolio, means re-generate the probabilistic set based on the new parameterization, run the loss calculation based on this new hazard set and compare with the standard hazard set (show LFC difference, show effect on adaptation cots curve).
- e.g. if different adaptation measures are investigated, this means evaluate the impact on the adaptation cots curve.
- e.g. if different policy options are investigated (e.g. building only in zones some distance to the coast), the impact shall be quantified by building a new assets base and again comparing the resulting adaptation cost curve. etc.
- e.g. if experiments in regard of time-preference and discounting (e.g. time-dependent discounting) are run, the effects shall be shown again in monetary terms on the adaptation cost curve.

Please start from the following areas for possible topics – topics that do not fit shall be briefly discussed with us – just to be sure nobody wastes time …:

- Environmental impact
  - Hazard
    - Explore impact of different probabilistic method
    - Explore impact of different wind model (instead of Holland)
    - Explore impact of (crude) roughness parameterization
    - Explore impact of other climate scenario representations
  - Adaptation measures
    - detailed impact of measure(s) - the ones shown in the template can be refined, to say the least. See e.g. slides from 9 May 2016.
- Societal impact
  - policy implications (e.g. zoning, such that new developments only happen say 5km from the coast) – develop new assets data…
  - how to integrate health-related measures into the framework? – Still try to quantify and produce an adaptation curve, but instead of cost, one might use other measures (climada does work if asset value is not dollars, but e.g. 'quality of life'…)
- Economic impact
  - Impact of discounting (discount rate sensitivity, time-dependency)

[1] In case one would like to use another measure, e.g. lives lost, there needs to be a consistent

- Framework
    - Parts of climada can definitely be improved…
    - One might investigate in additional visualizations of results
- Region
    - Instead of using the Florida example, generate centroids for another region and start from there … (as long as you stay within the North Atlantic region, the same TC tracks can be used to generate the hazard set). Please consider the climada module "country_risk" which allows generating centroids for any country[2].
    - Consider generating the hazard event set for another basin, e.g. in Asia … and adapt all necessary input to the adaptation cost calculation accordingly (generate hazard event set, assets, measures…) but climada does all the calculations for you, hence absolutely feasible.
    - Instead of using TC Florida, one could also use winter storms in Europe – the hazard event sets are on GitHub[3]. Similar questions as above can then be asked…and answered☺.
    - Consider developing the hazard set for a new peril[4], all from scratch, e.g. for bushfire in Australia – if you keep it simple, this can be done (use a random generator to create the fire footprints, assign reasonable frequencies[5]…). Building on this, develop the adaptation cost curve for this region, peril and appropriate measures…
- Overall uncertainty analysis
    - What are the most relevant choices and uncertainties – e.g. write a code that perturbs different climada parameters and quantifies the impact (again on adaptation cost curve…or on key dimensions of it, like PV of averted loss… or percentage of PV of averted loss that can be cost-effectively dealt with). As mentioned, writing code that runs (hundreds) of calculations each time e.g. changing some content of entity[6], eases such work.

Final paper, due Mon 27 June 2016

- One paper for each group, max 3 people per group
- Shall document Exercise 1 and Exercise 2 – answers to the questions in the two exercise sheets. Focus on results (figures, numbers) rather than background. Short discussion sections of the results are welcome.
- Shall document the climada (and other Matlab) code in an Appendix (really just copy/paste your code in small font – if longer code, e.g. for a new hazard, please send the code as m-file(s), too).
- The shorter the better, order of less than 8 pages total (plus appendices as appropriate), but no penalty for longer papers
- The paper is due latest Mon 27 June 2016.
- Final mark will be the average of the four marks given for exercise 1, exercise 2, and presentation 1 or 2 (whichever you did).

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[2] See https://github.com/davidnbresch/climada_module_country_risk
[3] See https://github.com/davidnbresch/climada_module_storm_europe
[4] See also https://github.com/davidnbresch/climada_module_tropical_cyclone
(not so much https://github.com/davidnbresch/climada_module_earthquake_volcano)
[5] See code `climada_excel_hazard_set`, which allows specifying the hazard in Excel and import to Matlab.

Appendix: For illustration, the effect of a few changes in assumptions

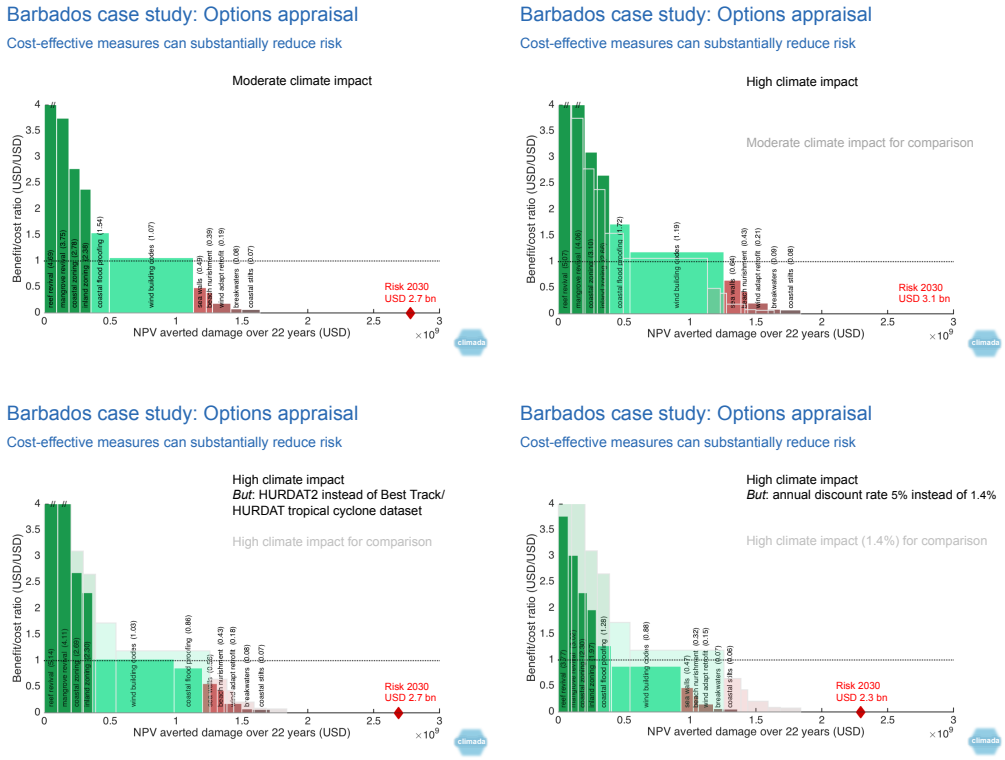

Figure: The effect of different assumptions on the final result (adaptation cost curve). Top left panel the adaptation cost curve for Barbados under moderate climate impact. Top right the effect of a high instead of moderate climate impact scenario (with the top left figure shown semi-transparent). Bottom left the same as top right, but with another tropical cyclone dataset, with the top left panel shown semi-transparent). Bottom right same as top right panel, but with a higher annual discount rate (top right panel shown semi-transparent again).