**Supplementary information to the manuscript:**

**FLOPROS: An evolving global database of flood protection standards**

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**1. Results of alternative choices for the Model layer and comparison to the Design layer**

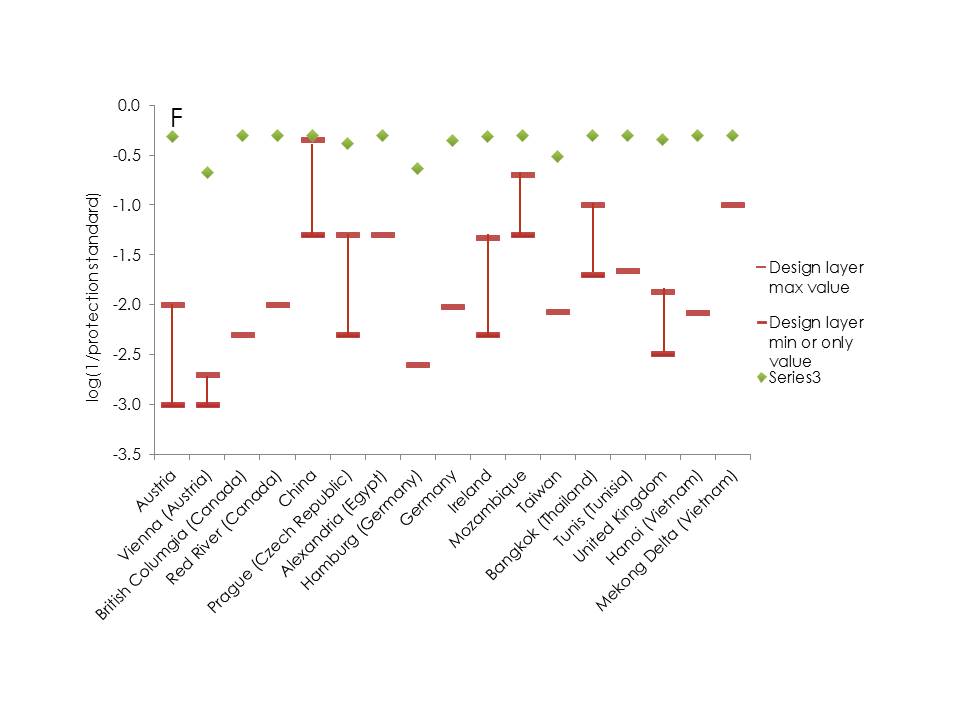
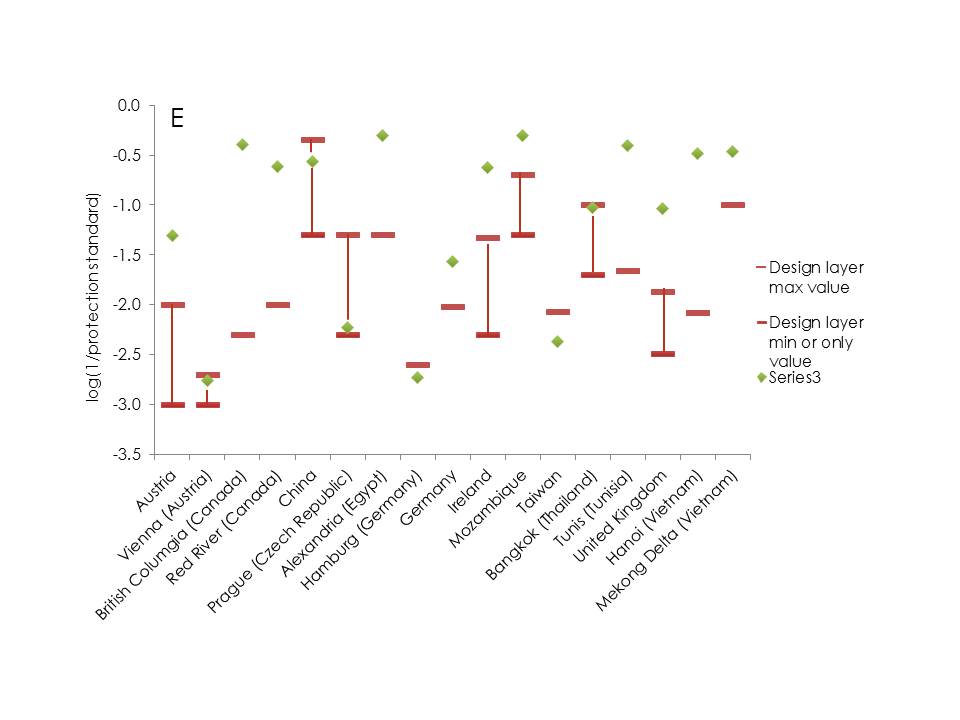
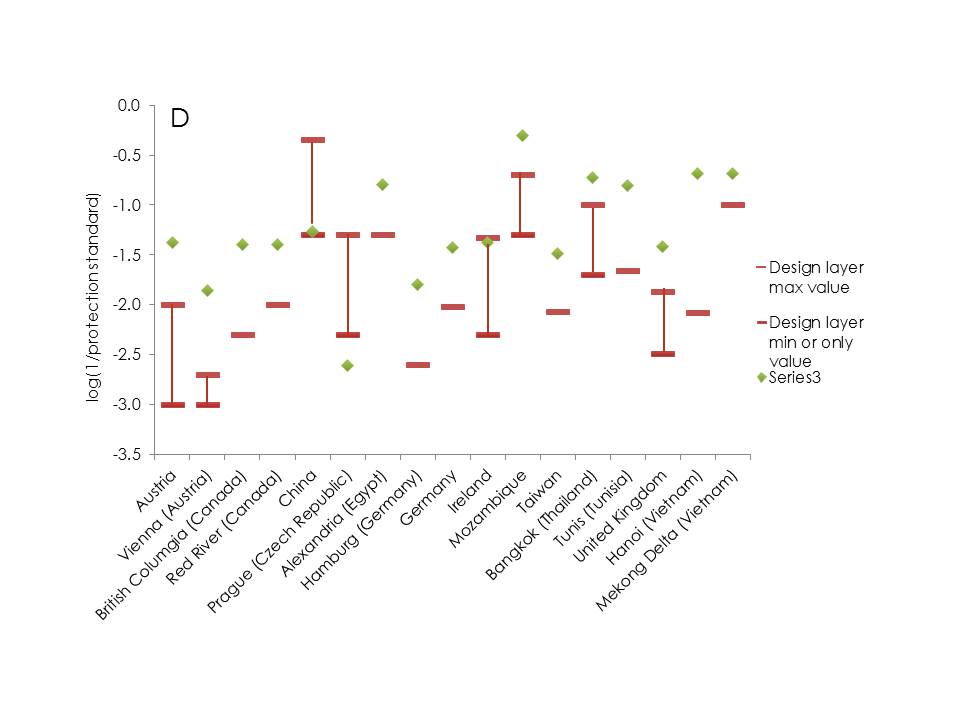
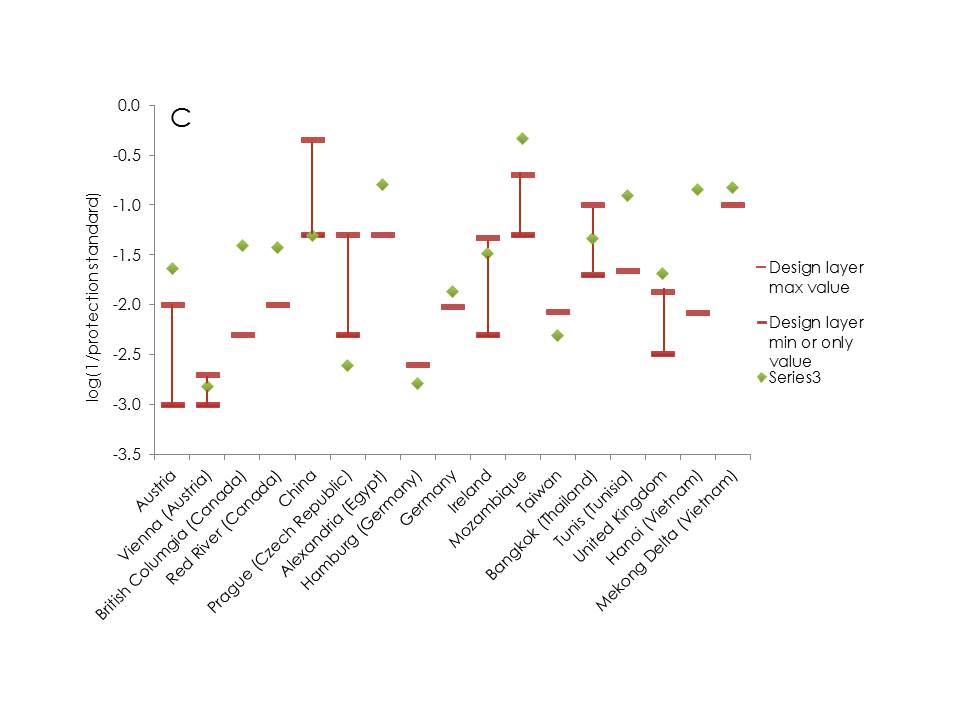
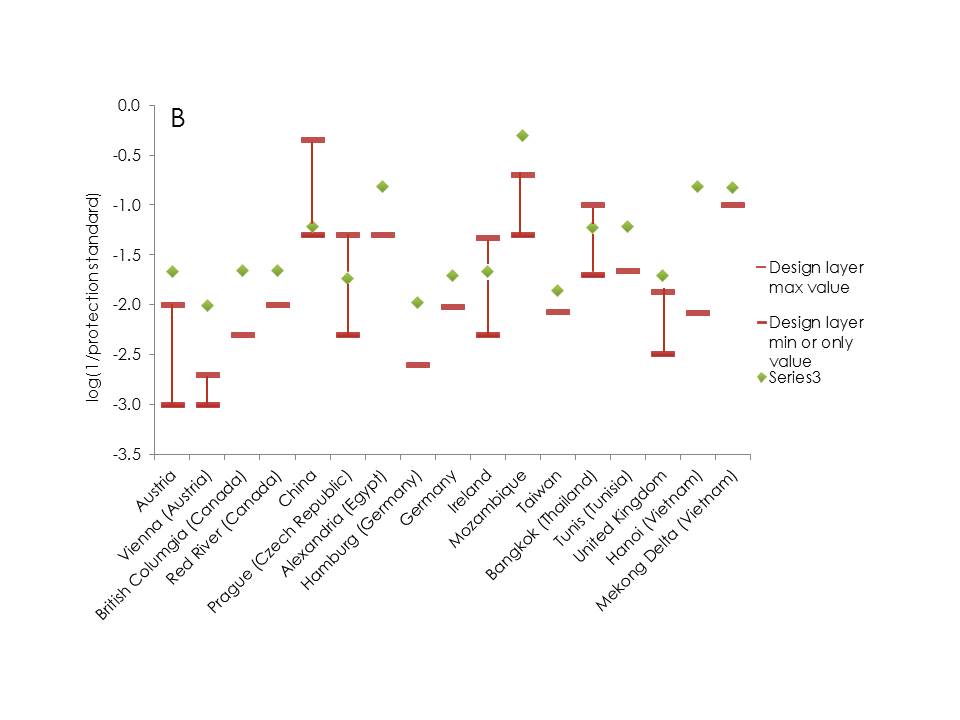
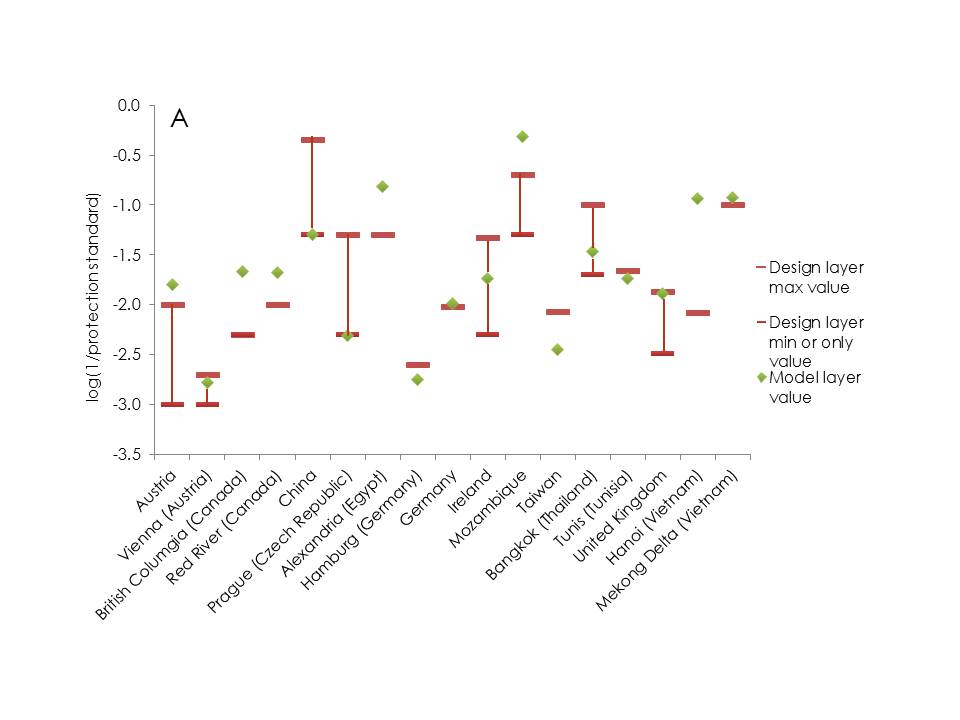


Fig. S1. Comparison of the various solutions for the Model layer (green diamonds) versus the Design layer standards (red bars), for regions where comparability of scale and Design-layer reliability is optimal. Model layer solutions plotted are A) World Bank income group aggregation and return period calculation; B) World Bank income group aggregation and exceedance probability calculation; C) United Nations regions aggregation and return period calculation; D) United Nations regions aggregation and exceedance probability calculation, E) No aggregation and return period calculation; F) No aggregation and exceedance probability calculation. For the Design layer, either a range of values or a single value are plotted. To enhance visual comparison, values are reported as logarithm of the annual exceedance probability relative to the protection standard.

**2. Comparison of protection between the Design and the Model layers.**

Table S1. Values of Design and Model layer protection standards for a set of locations for which comparison is possible on a spatial scale. In cases where the comparison involves several country-scale units in the Model layer the average (of the exceedance probability) was taken.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Reference | Design layer | Model layer |
| Austria | Zurich (2014) | >=100 | 48-600 |
| Danube (Austria) | Ceframe (retrieved Mar. 2015) | 100-1000 | 60-600 |
| Vienna (Austria) | Zurich (2013) | 500 | 600 |
| Dhaka (Bangladesh) | Asian development bank (2002) | 50 | 3 |
| Kruibeke (Belgium) | EU OURCOAST Project (retrieved Nov. 2014) | 350 | 242 |
| British Columbia (Canada) | Musy et al. (2014); North Vancouver District (retrieved Nov. 2014); Province of British Columbia | 200 | 46 |
| Red River (Canada) | Red River Basin Commission (2010) | 100-250 | 48 |
| China | Zhang Hai-Lun (2004) | 10-20 | 16-40 |
| China (rural) | Hong Kong Government (retrieved Nov. 2014) | 2-20 | 16-40 |
| Jingdezhen (China) | World Bank (2013) | 50 | 22 |
| Foshan (China) | Zhang et al. (2008) | 20-50 | 32 |
| Chengdu (China) | Jha et al. (2012) | 200 | 19 |
| Guangzhou (China) | Nathwani et al. (2009) | 20 | 32 |
| Ningbo (China) | Nathwani et al. (2009) | 20 | 23 |
| Qingdao (China) | Nathwani et al. (2009) | 20 | 19 |
| Tianjin (China) | Nathwani et al. (2009) | 20 | 24 |
| Pearl River Delta (China) | Tracy et al. (2007) | 10-50 | 32 |
| Southern Taiwan | Huang et al. (2015) | 150 | 168-297 |
| Taipei (Taiwan) | Taipei city government (2001) | 50-200 | 776 |
| Prague (Czech Rep.) | Floodmaster intranet (retrieved Nov. 2014); Povodí Vltavy (2007) | 20-200 | 204 |
| Dyje River (Czech Rep.) | Ceframe (retrieved Mar. 2015) | 20-100 | 52 |
| Morava River (Czech Rep.) | Ceframe (retrieved Mar. 2015) | 20-100 | 49 - 66 |
| Alexandria (Egypt) | Nathwani et al. (2009) | 20 | 7 |
| Hamburg (Germany) | EU (2009) | 400 | 560 |
| Isar River (Germany) | Zurich (2014) | 30-100 | 86 |
| Inn River (Germany) | Zurich (2014) | 100-500 | 86 |
| Rhine River (Germany) | te Linde et al. (2011); ICPR (2005) | 200-1,000 | 166-249 |
| Kumasi (Ghana) | Jha et al., 2012 | 0 | 7 |
| Kolkata (India) | Nathwani et al. (2009) | 20 | 11 |
| Waterford (Ireland) | O'Donovan (2014) | 100 | 76 |
| Ireland | O'Donovan (2014) | 20-200 | 46-432 |
| Mozambique | Carmo Vaz, 2000 | 5-20 | 2 |
| Hutt river basin (New Zealand) | New Zealand Government (retrieved on Nov. 2014) | 440 | 46 |
| Waikanae river basin (New Zealand) | Greater Wellington Regional Council (retrieved on Nov. 2014) | 100 | 46 |
| Whakatane river basin (New Zealand) | Britton (2008) | 100 | 68 |
| Saint Petersburg (Russia) | Hunter (2012); Whitelaw  (2009) | 1,000-10,000 | 46 |
| Morava river (Slovakia) | Ceframe (retrieved Mar. 2015) | 100 | 49-66 |
| Bangkok (Thailand) | World Bank (2009b); World Bank (retrieved on Nov. 2014); Nathwani et al. (2009) | 10-50 | 30 |
| Tunis (Tunisia) | Goverment of Tunisia (no year specified) | 45 | 55 |
| Northern Ireland (UK) | DARDNI (2013) | 50-100 | 46-85 |
| London (UK) | The Guardian (2009) | 1,000 | 46-678 |
| Hanoi (Vietnam) | World bank (2009) | 120 | 9 |
| Mekong Delta (Vietnam) | World bank (2011) | 10 | 7-12 |

**3. Form for entries to the database**

Table S2. Form for entries to the database.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Location: |  | | | | | | | |
| Scale: | District  ☐ | City  ☐ | | River stretch/basin  ☐ | | Province  ☐ | | Country  ☐ |
| River or coastal flood: | River  ☐ | | Coastal  ☐ l | | Both  ☐ | | Unspecified  ☐ | |
| Enter any Shapefile or coordinates: |  | | | | | | | |
| Standard of protection (in return period years): | Min (or only): | | | | Max: | | | |
| Type of protection (see Methods): | Physical (Design layer)  ☐ | | | | Legal (Policy layer)  ☐ | | | |
| Description: |  | | | | | | | |
| Objective: |  | | | | | | | |
| Completion year: |  | | | | | | | |
| Climate change considered? |  | | | | | | | |
| Reference: |  | | | | | | | |

**4. FLOPROS database files**

The FLOPROS database is made available via two documents:

* An Excel spreadsheet, “FLOPROS\_Database\_Design\_&\_Policy\_layers\_V1“, contains the information of the Design and the Policy layers, including a full list of references.
* A Shapefile, “FLOPROS\_shp\_V1”, provides the information on the protection standards of the Model layer, along with the information of the Design and Policy layers that is compatible with the sub-country unit scale of the map. Further, the Shapefile includes information on the Merged layer that results from the other three layers. Protection standards in the Design and Policy layers are provided both as minimum and maximum values. For the Design and Policy layers, different fields report protection standards for river and for coastal flood. A “Readme” text file is included to explain the content of the each field in the Shapefile.

Note that in the case of any discrepancy regardingspatial or administrative units, the “FLOPROS\_Database\_Design\_&\_Policy\_layers\_V1” Excel document should be referred to for reference. Moreover, many entries in the database are not represented in the Shapefile, as the administrative units used do not allow a coherent spatial resolution. The database information that is represented in the “FLOPROS\_shp\_V1” Shapefile is indicated in the green cells of the “FLOPROS\_Database\_Design\_&\_Policy\_layers\_V1” Excel file.