FDM - The "Flood Damage Models" repository – working plan

Objective

Flood damage assessment is a quite recent topic in flood risk management (especially as regard its implementation in technical and policy instruments); nevertheless, several tools are now available for flood damage estimation which are characterised by different levels of robustness and reliability and no model can be, at present, considered as a standard.

In such a context, the choice of the more suitable model(s) to be implemented can be challenging, above all for non-expert users, and may imply significant errors in damage estimates if done without a critical knowledge of models' limits and usability.

A key question concerns the coherence between the scales of analysis. Damage models are usually developed and validated to be applied at a specific scale (e.g. micro, meso, global) and can be unreliable when implemented at different scales; similar problems may arise when models are used to estimate damage due to a different type of flood or a different vulnerability context compared to the one analysed in the models. Another question concerns the ability of existing damage tools to cover the variety of exposed assets. Most models are focused on damage to specific items, like residences or agricultural activities, and may supply a partial vision of the real expected damage. At last, problems may arise with respect to the specific inputs required by the model and available data.

The "flood damage models" repository (FDM) is aimed at supporting flood damage modellers, especially non-expert ones, in the choice of the best available model(s) for a specific context under investigation and a specific problem at stake, by supplying (for each available model) key information that, if ignored, can lead to an improper use of models and then significant errors in flood damage assessment. With this objective in mind, the repository wants to be more than a review or a database of existing models, but rather an operative tool in the support of more reliable analysis.

The repository has been thought as a participatory effort by the research community. All researchers working in the field of flood risk (as flood damage models' developers or users) are encouraged to contribute in and share their experience, to reach the common goal of improving flood damage and risk estimates. As a consequence, the repository is also an opportunity to increase knowledge and knowledge gaps on flood damage assessment tools.

Methods

An "alfa" version of the repository will be proposed by the group of Politecnico di Milano (i.e. PoliMI in the following), which is leading the initiative as member of the IAHR Flood Risk Management Technical Committee (FRM TC). In particular, the PoliMi group (i) will identify the key information to be supplied for each model, (ii) will develop a first spreadsheet for its collection, and (iii) will perform preliminary tests on the functionality of the repository. Table 1 supplies a first tentative structure for the repository.

The alfa version will be then shared with a restricted community of researchers (i.e. the Consortium, in the following). In particular, the Consortium will be asked to further test the repository by inputting other models. The main objective is to verify the suitability of the FDM to include all the possible typologies of models (in terms of scale of analysis, type of flood, exposed objects, level of uncertainty, etc.). In the compilation of the repository, researchers will be asked to explore all the existing literature on a specific model (including the grey one, like technical reports) and to contact models' developers if required, in order to input all the available knowledge on the model.

Improved version(s) of the repository will be developed and further tested, on the base of results from previous testsf. Once agreement on its structure will be reached within the consortium, the repository will be transferred to an ICT platform and filled in with a common effort by the consortium. Soon after, the FDM will be launched as a "beta" version and opened to the whole community of researchers, asking for further contributions. At the same time, the repository will be advertised within the technical community.

Type of datum	Datum	Range of values/Description
Filters for browsing the repository	Country (of development)	
	Scale of analysis	single item, aggregated units, regional/national, global
	Flood type I	riverine flood, pluvial flood, coastal flood
	Flood type II	low velocity, high velocity
	Model type I	Relative, absolute
	Model type II	Empirical, synthetic, mixed
	Model type III	Deterministic, probabilistic, both
	Exposed item/sectors	e.g. residences, industrial settings, roads, etc.
ID	Name	
	Year (of release)	
	Authors	
	Linked models	e.g. for other exposed items/sectors, upgrading, etc.
	Expression	e.g. graph, formula, software
Model inputs	Hazard parameters	Data and metadata (if available)
	Exposure parameters	Data and metadata (if available)
	Vulnerability parameters	Data and metadata (if available)
Info on calibration	Calibration context	e.g. only for a specific range of H, E, V
	Dimension of the dataset	
	Quality of the data	e.g. observed or modelled water depths, single or aggregated damage data,…
Info on validation	Error	e.g. ME, bias, etc.
	Dimension of the dataset	
	Quality of the data	
	Validation context	e.g. only for a specific range of H, E, V
	Transferability	
Bibliography	Model	
	Calibration/validation	

Table 1: tentative structure of the repository

This work is in progress and additional information will be offered as soon as they are available. If you want to contribute in, please contact daniela.molinari@polimi.it