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Development of a module in hydrology to transmit the principles of flood mitigation to schoolchildren

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Floods represent in France the most common natural risk. If everybody knew how to behave during floods, damages could be reduced and many troubles spared. Current national policies put forward the need to increase flood awareness. However, the lack of adapted educational tool still represents an obstacle to convey the scientific knowledge by the environmental associations or French water administrations to a large public. So, when invited to give talks to the public, the authors chose to develop a pedagogical module associated with a physical model of a river basin to explain floods and to comment on flood mitigation techniques, their characteristics and their limits. The pedagogical module was divided into seven sequences to introduce hydrological basics to children - for example the notion of discharge and volumes. It was based on picture analysis and small experiments they can be carried out. Hence a physical model of a river basin was devised to represent a river and its valley, with natural and agricultural lands, villages and a city. Its size (about 1mx2m) allows an audience of ten to gather around and observe. Yet every part is reachable to add and test mitigation solutions. The model is fed by a pump and the discharge can be modified at will by a gate. So, floods of different intensities can be successively tested. Children are invited to observe the model and think on several questions, like *'what are the differences between the model and the reality?'* or *'why do floods occur; are they natural or man-caused'?* Then, the audience is asked to guess which areas of the model will be flooded often or rarely, which introduces the notion of flood probability (hazard). By asking to ponder in which areas the floods are the most (in)tolerable, the idea of vulnerability is introduced. After sorting out what should be protected first,

which amounts to a rough risk analysis, everybody is asked to propose and test on the model different remedies: levees, river widening (through bridge replacement) and upstream dams. For each experiment, efficiency and limits are discussed. Depending on the audience age and level, many other elements like costs, public perception of flood hazards and engineering works, dangers and consequences of dam-break, as well as effects on the environment can also be considered. This experience was successfully carried many times and improved. Talking to a large public allowed us to check how people perceived floods and what they really knew. The interactive model attracts people's curiosity, thus making it easier to promote flood awareness. Similar models could be useful for local authorities to communicate about flood risk or to explain their policy and projects.