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May flood-poor periods be more dangerous than flood-rich periods?

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River floods are among the most devastating natural hazards experienced by populations that, since the earliest recorded civilisations, have settled in floodplains because they offer favourable conditions for trade, agriculture, and economic development. The occurrence of a flood may cause loss of lives and tremendous economic damages and, therefore, is rightly seen as a very negative event by the communities involved. Occurrence of many floods in a row is, of course, even more frustrating and is rightly considered a unbearable calamity. Unfortunately, the occurrence of many floods in a limited number of consecutive years is not unusual. In many places in the world, it has been observed that extreme floods do not arrive randomly but cluster in time into flood-poor and flood-rich periods consistent with the Hurst effect. If this is the case, when are the people more in danger? When should people be more scared? In flood-poor or flood-rich periods?
In this work, a Socio-Hydrology model (Di Baldassarre et al., 2013; Viglione et al., 2014) is used to show that, maybe counter-intuitively, flood-poor periods may be more dangerous than flood-rich periods. The model is a conceptualisation of a hypothetical setting of a city at a river where a community evolves, making choices between flood management options on the floodplain. The most important feedbacks between the economic, political, technological and hydrological processes of the evolution of that community are represented in the model. In particular, the model also accounts in a dynamic way for the evolution of the the community awareness to flood risk. Occurrence of floods tends to increase peoples' recognition that their property is in an area that is potentially at risk of flooding, both at the scales of individuals and communities, which is one of the main reasons why flood coping actions are taken. It is shown through examples that frequent flood events may result in moderate damages because they ensure that the perception of risk and, consequently, people preparedness remains high. Conversely, long periods without floods will serve to diminish awareness, since the memory of floods tends to be short (i.e. people tend to forget quickly), finally leading communities to take too high risks.

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