Hydrol. Earth Syst. Sci. Discuss., 8, C3733–C3734, 2011
www.hydrol-earth-syst-sci-discuss.net/8/C3733/2011/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Estimating the benefits of single value and probability forecasting for flood warning" *by* J. S. Verkade and M. G. F. Werner

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Received and published: 31 August 2011

I totally agree with the vision of the paper and the importance of including the cost of "forecast uncertainty" (i.e. costs of false warnings and misses) in the estimate of FFWRS "performance". Some minor comments:

1) Line 16-20: recently at the 34Th IAHR congress in Brisbane I presented a paper about my PhD thesis. In my flood risk analysis to assess FFWRS performance, first-aid and warning costs (which can occur both in the case of false warnings and hits) have been included. Moreover, damage in case of flood has been evaluated according

to whether (or not) a warning have been issued before the event (and , in their turn, mitigation actions have been implemented) taking into account, this way, of misses. Of course mine is another attempt to evaluate what you called forecast uncertainty. Here the reference of my paper: Molinari D., Ballio F., Menoni S., Flood forecast verification to support emergency management, Proceedings of 34th IAHR World Congress, Brisbane, 26 June-1 July 2011

2) One of the main benefit of having warning refers to limiting indirect (e.g. services disruption, secondary damages, etc.) and intangible (i.e. loss of life) damages, although direct damages can be partly limited too (the Multi Colored Manual by the FHRC reports however a 4,5 % reduction which is low compared to what can be achieved with other mitigation measures). Moreover indirect damages can be greater than direct in case of flood. As a general comments for future research, it is important then to widen the method, which is worth, to include at least indirect damages. Of course, the "open question" about how indirect damages can be estimated must be faced first.

3) Looking at real emergency/contingency plans, it is evident that the cost of warning/response depends on the severity of the flood (i.e. depth). In detail, some measures like evacuation, service interruption, etc. are put into practice only if major events are forecasted while other measures (like surveillance, sandbagging, traffic gates, etc.) are always implemented. The assumption about event costs being independent on flood height should be revised then but it is ok as a first simplification.

4) Line 20: according to eq. 8 V depends on r also through h. Although there are no false warnings, hits are present for the 1-h forecasts. Thus, REV is dependent on the cost loss ratio.

5) In conclusion, warning rules must be fit on user's cost-loss ratio. However, from this perspective, a problem arises at the moment as warning costs are far to be properly estimated. Efforts in this direction are required to put the method into practice.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 6639, 2011.