



## **Towards real time assessment of flood risk damage : an application of the AIGA method in the south of France.**

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Anticipating floods is a major challenge for communities at risk of flooding as the entire warning system – responsible for the safety of people and goods - relies on this anticipation. There is an existing monitoring system “Vigicrues” for flood damage for a fifth of the river network in France. But for four-fifths of this network, made of small rivers, no monitoring is available. Yet those rivers are the most affected by flash floods which especially require

anticipation for crisis management purposes. This is why at the beginning of 2017, the Vigicrues system for flood monitoring has been completed with a new flood warning system called Vigicrues Flash. This system provides automatic information in real-time on flood severity of ungauged basins for 10 000 French communities. Even if this new system is a real innovation for communities with no monitoring at all, the AIGA method which is used in Vigicrues-Flash has some limits. The first one is that the warnings are only based on the assessment of flood severity. But estimating flood severity is not enough to issue efficient flood warnings. To be able to do so, taking into account potential flood losses is essential. The main goal of this work is to enable an anticipated estimation of flood related damage, especially for ungauged basins. We offer a method to assess the risk of flood related damage based on flood severity assessed by the AIGA method and a territorial vulnerability assessment. This last one has been built on a bottom-up approach developed with crisis managers. Putting together this data has enabled a first assessment of the risk of flood risk damage as a dynamic risk index. By adjusting performance testing used in the meteorology field, we have been able to evaluate our risk index and to compare the results with the AIGA method. In order to do so, we have used existing damage data (CATNAT from the GASPARD database) as well as a specific multisource database (using notably social media data) which has been put together as part of this study (Dam-aGIS). The evaluation process has been tested for 12 communities in the Alpes-Maritimes, 69 in the Gard and 28 in the Var department. Two types of evaluation have been performed: a first comprehensive one continuously with CATNAT data on the

1988-2016 period; and another one per flood event at a finer scale. Our results show that moving from hazard assessment to risk assessment has significantly increased the relevance of the warnings and mostly at a smaller scale than the community one. Though, there is a better detection of flood related damage as the false alarm rate has been significantly reduced. This work offers promising prospects to improve the current French warning system for floods and enable a more efficient emergency response.