Geophysical Research Abstracts
Vol. 20, EGU2018-9316, 2018
EGU General Assembly 2018

Changing risk of compound flooding over Europe in response to climate change

Emanuele Bevacqua (1), Douglas Maraun (1), Michalis Vousdoukas (2,3), Evangelos Voukouvalas (2), Mathieu Vrac (4), Lorenzo Mentaschi (2), and Martin Widmann (5)

(1) Wegener Center for Climate and Global Change, University of Graz, Graz, Austria (emanuele.bevacqua@uni-graz.at), (2) European Commission, Joint European Research Centre (JRC), Ispra, Italy, (3) Department of Marine Sciences, University of the Aegean, Mitilene, Greece, (4) Laboratoire des Sciences du Climat et de l'Environnement, CNRS/IPSL, Gif-sur-Yvette, France, (5) School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham, UK.

Compound flooding (CF) is an extreme event taking place in low-lying coastal areas as result of the interaction between co-occurring high sea level and a large amount of precipitation. The individual impacts from the above hazards can be significantly lower than the result of their combination. Studies about CF risk assessment at large scale are few, and no analyses have been carried out to assess the risk in future climate. Here, we introduce the concept of "potential risk" as we do not focus on the effective impact due to the interaction between extreme precipitation and sea level, but on the probability of co-occurrence of these two hazards. We estimate the potential CF risk along the European coastline both for present day and future climate under the RCP8.5 scenario. Under current climate conditions, the locations experiencing the highest risk are mostly located along the Mediterranean Sea. However, future climate projections show emerging risk in many locations of the Atlantic coast and the North Sea. For example, the probability of CF occurrence will double in the Netherlands. Changes in the risk will be mostly driven by variations of precipitation extremes. The results indicate that increasing CF can aggravate further the sea level rise driven risk along several European coastal regions. Potentially, considering CF when assessing coastal risk can improve adaptation practices for several regions.