



Synergy of Sentinel 1 and 2 for emergency flood mapping and the monitoring of large inland water bodies based on a 10-year experience with active and passive remote sensing from space

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Passive and active spaceborne remote sensing instruments have been used for Earth Observation (EO) purposes for more than 30 years. The importance of water resources and the escalating frequency and intensity of flood events around the world during the last decades, emphasize the necessity of their timely and cost-effective monitoring by Remote Sensing techniques, with no risk for human lives (EU, 2007).

Being the European contribution to the Global Earth Observation System of Systems (GEOSS), the Sentinel missions are part of EU & ESA [U+201F]s Global Monitoring for Environment and Security (GMES) initiative, aiming at the provision of European data sources for environmental monitoring and security. The purpose of this paper is to present the contribution from near-future missions and especially from Sentinel-1 (SAR) and Sentinel-2 (Optical/IR), in the direction of improving the current capacity of Earth Observation to detect and monitor flooded areas and inland water bodies.

Prior to presenting the foreseen improvements that the Sentinel missions will bring, the analysis of the recent experience and resulting requirements for flood/inland water monitoring with active and passive spaceborne instruments is due. This is carried out using results and experience gained within, the „[U+201F] International Charter Space and major disaster [U+201F] [U+201F] and the former GMES ESA GSE projects, Respond and Riskeos, the recent GMES SAFER project as well as other relevant case studies of the last decade such the Sino European „[U+201F] Dragon project on flood plain monitoring in China. Based on this experience, the desirable (optimum) and minimum requirements are described, with respect to the capabilities of near-future satellites for waterflood monitoring.

It is foreseen that the Sentinels will be able to meet some of these requirements or introduce improvements in this direction; larger swath, regular and shorter revisit time, systematic acquisition strategy over high-risk zones, fast data dissemination, along with the potential of synergistic use of Sentinel-1 and Sentinel-2 data. By the way the Sentinels will be a milestone of the spatial train dedicated to risk management. While Sentinels will insure an efficient routine surveillance mission, VHR satellites like Pleiades will be tasked on demand over smallest areas where stakes are higher.