



Dikes under Pressure – Monitoring the Vulnerability of Dikes by Means of SAR Interferometry

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Dikes are the main man made structures in flood protection systems for the protection of humans and economic values. Usually dikes are built with a sandy core and clay or concrete layer covering the core. Thus, dikes are prone to a vertical shrinkage due to soil physical processes such as reduction of pore space and gravity increasing the risk of a crevasse during floods. In addition, this vulnerability is amplified by a sea level rise due to climate change. To guarantee the stability of dikes, a labourer intensive program is carried out by national authorities monitoring the dikes by visual inspection.

In the presented study, a quantitative approach is presented using SAR Interferometry for the monitoring of the stability of dikes from space. In particular, the vertical movement of dikes due to shrinkage is monitored using persistent scatterer interferometry. Therefore three different types of dikes have been investigated: a sea coast dike with a concrete cover, a sea coast dike with short grass cover and a smaller river dike with grass cover. All dikes are located in Germany. Results show the potential of the monitoring technique as well as spatial differences in the stability of dikes with subsidence rates in parts of a dike up to 7 mm/a.