

## Comparison of InSAR and Lidar derived deformations over Rotterdam

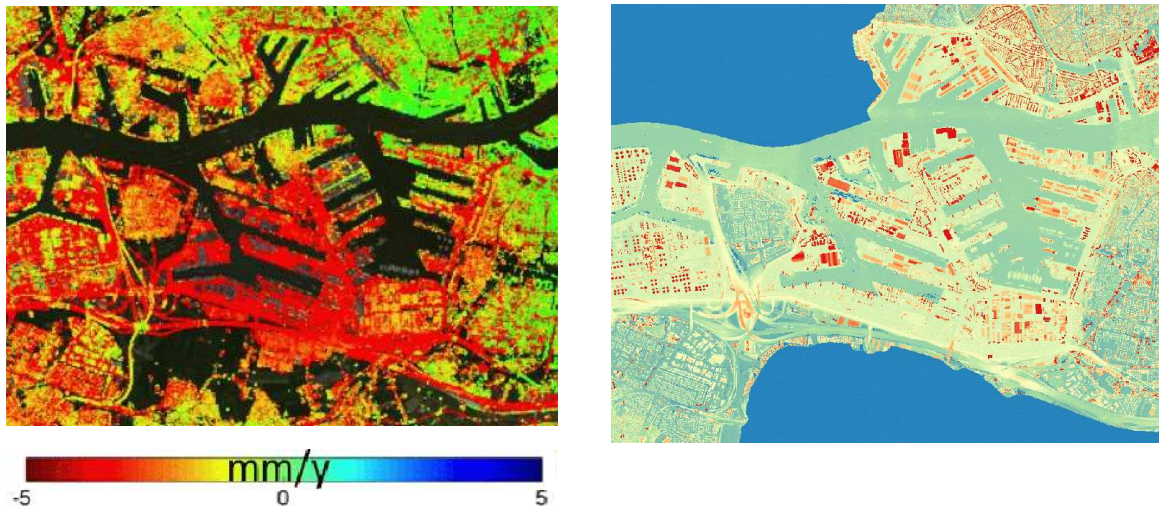


Figure 1: Left. InSAR derived deformation velocity map between 2009 and 2013. Right. Elevations from the Rotterdam city Lidar archive in 2014.

**Research context.** Many different processes could lead to subtle or less subtle changes in our built-up environment. Examples of such processes are groundwater or gas extraction and soil compaction after building activities. Application of interferometric techniques on Synthetic Aperture Radar (SAR) images is able to reveal deformations at the mm level. Lidar data give a detailed view of the 3D structure of a city but is less accurate in deformation detection.

**Purpose of the research.** Over Rotterdam a detailed InSAR derived deformation velocity map is available, see Figure 1, left. The SAR data used is acquired from TerraSAR-X satellite between April 2009 and June 2013. In addition Rotterdam obtained dense Lidar data in 2008, 2010, 2012 and 2014, compare Figure 1, right. Goal of the project is to estimate deformation velocities from the Lidar data as well and compare the outcomes to the InSAR velocities. The results of the comparison should indicate what size of deformations can be estimated using Lidar data and should give more insight in what is deforming in the InSAR data.

**Supervision.** The work will be jointly supervised by Roderik Lindenbergh (Lidar) and Ling Chang (InSAR). Ramon Hanssen will be the thesis professor. Results will be discussed with Gemeentewerken Rotterdam.

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