

## **Preparation of a national Copernicus-service to support hazard mitigation by surface motion detection**

A. C. Kalia <sup>a,\*</sup>, M. Frei <sup>b</sup>, T. Lege <sup>c</sup>

<sup>a</sup>Federal Institute for Geosciences and Natural Resources (BGR), Stilleweg 2, 30655 Hannover, Germany – Andre.Kalia@bgr.de

<sup>b</sup>Michaela.Frei@bgr.de <sup>c</sup>Thomas.Lege@bgr.de

**THEME:** Natural Disasters Monitoring, Warning and Response

**KEY WORDS:** wide area persistent scatterer interferometry, ERS-1/2, gas extraction, subsidence, Germany

### **ABSTRACT:**

A national Copernicus-service is being prepared at BGR because surface motion, e.g. subsidence could cause infrastructure damage and mass movements could also lead to loss of live. Detection of these processes by terrestrial measurements (e.g. levelling) remains a challenge due to limitations in spatial and temporal sampling rate. Several research projects, e.g. GMES (Global Monitoring for Environment and Security) TerraFirma, GMES PanGeo showed the maturity of advanced differential SAR-Interferometry (DInSAR) techniques to detect surface motions with accuracies comparable to levelling (Crosetto et al. 2008, Crosetto & Cuevas 2011). Furthermore DInSAR has been of increasing interest within the geohazard community (Bally 2011). Nevertheless, there is currently no operational service regarding DInSAR based surface motion detection.

The national Copernicus-service is being prepared at BGR by i) analyzing the national user requirements by carrying out workshops, ii) developing a service concept and iii) perform case studies as “proof of concept”. Due to the iterative nature of this approach users as well as DInSAR experts are involved. Identified user requirements, the initial concept and a case study will be shown in the presentation. The case study is focusing on the detection of subsidence at natural gas production sites using the wide area persistent scatterer interferometry technique (WAP, Adam et al. 2011). The area of interest covers 15.730 km<sup>2</sup> and is located in the state of Lower-Saxony, northwest Germany. Five ERS-1/2 tracks, acquired in descending orbit, are used for processing. Each stack of SAR imagery consists of more than 50 scenes in order to enable highly reliable velocity estimates for each persistent scatterer. The SAR imagery is covering the timespan from 1992 until 2001. To adjust the WAP to the user needs and optimize the initial concept the WAP results is discussed with the responsible mining authority (LBEG).

---

\* Corresponding author.