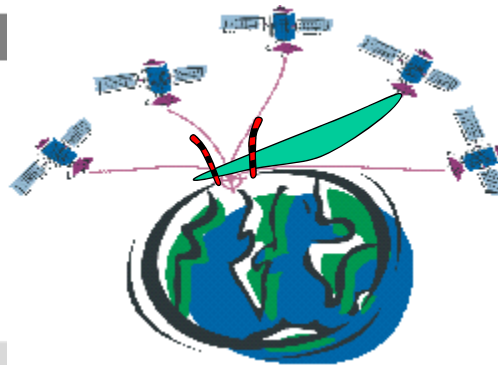


## Karlsruhe Integrated Displacement Analysis Approach Towards a rigorous combination of different geodetic methods

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### Our Motivation

#### Geodetic observation techniques to determine recent displacements

	Levelling	GPS	PS-InSAR
<b>Dimension</b>	1D	2D + 1D	1D (LOS) -> 3D
<b>Information</b>	points along line	point-wise	wide coverage
<b>Data History</b>	1925 - 2011	1995 - ....	1991 - ....
<b>Time Sampling</b>	5 – 20 a	1 d	11 – 35 d
<b>Accuracy</b>	+/- 0.3 mm/a	+/- 1.0 mm/a +/- 2.5 mm/a	+/- 1.0 mm/a



**Single-Sensor Solutions**

## Our Motivation



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**Rigorous Multi-Sensor Fusion**

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14<sup>th</sup> April 2010

B. Heck et al. "Karlsruhe Integrated Displacement Analysis Approach (KIDAA)"  
FS 4G - Engineering Surveys II, FIG Congress 2010, Facing the Challenges – Building the Capacity

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## Steps of KIDAA



- **Improvement of data processing by:**
  - Combined analysis of GNSS and PS-InSAR with respect to atmospheric influences
  - Extension of kinematic modelling of levelling networks
- **Validation of PS-InSAR by levelling results**
- **Derivation of a multi-sensor approach and integration of all displacement vectors to a joint geodynamic model**

4

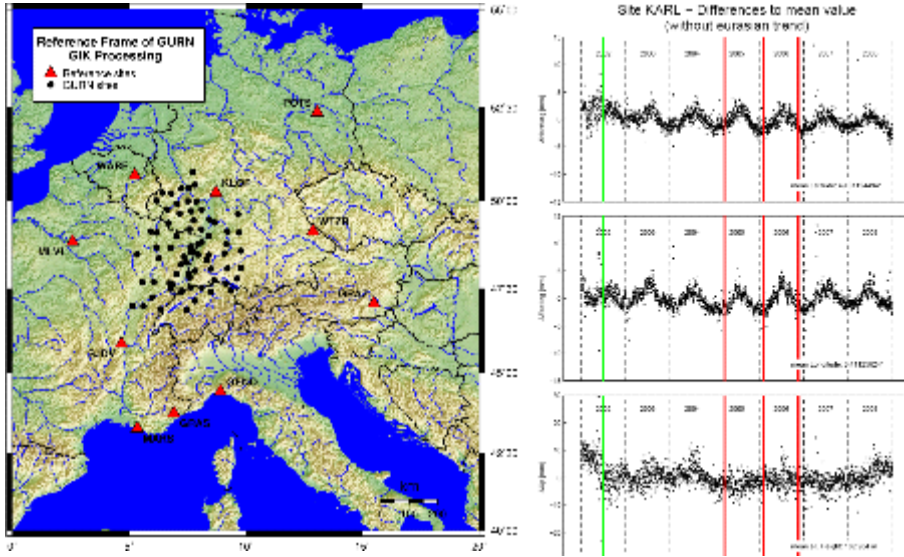
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## Our Experience – GURN: GNSS Upper Rhine Gaben Network

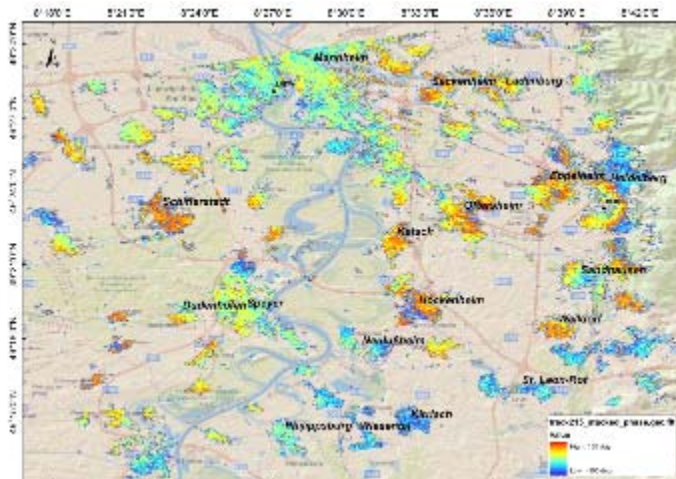


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## Our Experience – InSAR and PS-InSAR



ENVISAT, C-band, stacked interferometric phase, 1996 - 2008

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