

***Monitoring Earth's deformation from space for seismic hazard, climate change, flood risk and sustainable development***

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Big data analytics of interferometric synthetic aperture radar (InSAR) data has captured the Earth's surface deformation at continental scales. Whilst initially motivated by the desire to understand continental tectonics and associated seismic hazard, this data set is allowing us to probe into myriad processes in the lithosphere, cryosphere and hydrosphere caused by active tectonics, global warming, and human activities. Using examples from 2 million km<sup>2</sup> of InSAR velocities over the northeast Tibetan Plateau and the Tien Shan, I show that whilst the horizontal velocity field largely represents active tectonics, the vertical velocity field contains deformation signals from damming, mining, groundwater extraction, permafrost melting and crustal rebound. Therefore, we will see many opportunities in applying InSAR for estimating seismic hazard, tracking climate change, and promoting sustainable development.