



Contents lists available at ScienceDirect

Int J Appl Earth Obs Geoinformation

journal homepage: www.elsevier.com/locate/jag



Using PS-InSAR to detect surface deformation in geothermal areas of West Java in Indonesia



Yasser Maghsoudi^{a,*}, Freek van der Meer^b, Christoph Hecker^b, Daniele Perissin^c, Asep Saepuloh^d

^a K.N. Toosi University of Technology, Faculty of Geodesy and Geomatics, Tehran, Iran

^b Department of Earth Systems Analysis, Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente, 7514 AE, Enschede, The Netherlands

^c Purdue University, Lyles School of Civil Engineering, United States

^d Bandung Institute of Technology (ITB), Bandung, Indonesia

ARTICLE INFO

Keywords:

PS-InSAR
Geothermal
Deformation
Sentinel-1
ALOS PALSAR

ABSTRACT

In this paper, the Persistent Scatterer InSAR (PS-InSAR) technique is applied in order to investigate the ground deformation in and around two geothermal areas in West Java, Indonesia. Two time-series of ALOS PALSAR and Sentinel-1A acquisitions, covering the period from 2007 to 2009 and 2015–2016, are analysed. The first case study examines the Wayang Windu geothermal zone where the PS-InSAR analysis provides an overview of the surface deformation around a geothermal reservoir. Uplift is observed around the injection wells in the area. The second example involves the use of the PS-InSAR technique over a more recent geothermal system in Patuha field. Again, a pattern of uplift was observed around the only available injection well in the area. Due to the dense vegetation coverage of the geothermal areas in West Java, the longer wavelength ALOS PALSAR data provides better results by identifying a larger number of PS points. Additionally, experiments have been carried out to compare the resulting deformation with another example of the fluid migration process i.e. water extraction in Bandung basin. The potential of sentinel-1A and ALOS PALSAR data are compared in all the experiments.