

Discussion of: Parcharidis, I.; Kourkouli, P.; Karymbalis, E.; Foumelis, M., and Karathanassi, V., Time Series Synthetic Aperture Radar Interferometry for Ground Deformation Monitoring over a Small Scale Tectonically Active Deltaic Environment (Mornos, Central Greece). Journal of Coastal Research, 29(2), 325–338.

Author: Stiros, Stathis C.

Source: Journal of Coastal Research, 29(4) : 998-999

Published By: Coastal Education and Research Foundation

URL: <https://doi.org/10.2112/JCOASTRES-D-12-00134.1>

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

Your use of this PDF, the BioOne Digital Library, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Digital Library content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.



www.JCRonline.org

DISCUSSION



www.cerf-jcr.org

Discussion of: Parcharidis, I.; Kourkouli, P.; Karymbalis, E.; Foumelis, M., and Karathanassi, V., Time Series Synthetic Aperture Radar Interferometry for Ground Deformation Monitoring over a Small Scale Tectonically Active Deltaic Environment (Mornos, Central Greece). *Journal of Coastal Research*, 29(2), 325–338.

Stathis C. Stiros

Department of Civil Engineering
Patras University
Patras 26500, Greece
stiros@upatras.gr

On the basis of a satellite-based persistent scatterers interferometric (PSI) study, Parcharidis *et al.* (2013) document the rapid active subsidence of a small delta. This subsidence is not an isolated effect (see below) and its amplitude is compatible with the resolution of tide gauges. Hence this article sheds light on a very important, though poorly known, coastal process, the rapid subsidence of major and smaller deltas, especially in the vicinity of abandoned streams. Still, there are two points that deserve a further analysis.

First, whether subsidence is combined with horizontal dislocations—a question to be answered if the geometry of the available satellite images permits, and second, which are the possible implications of their findings concerning the geotechnical noise in tide-gauge data, another ignored problem.

This last point is point is very important because rapid subsidence of deltaic sediments, though at a larger scale, is known for instance from Louisiana (Dixon *et al.*, 2006; Morton and Bernier, 2010), the Po plain in Italy (Baldi *et al.*, 2009; Stramondo *et al.*, 2007), and the Axios (Vardar) delta in northern Greece (Psimoulis *et al.*, 2007; Stiros, 2001). In the Mississippi and Axios deltas, subsidence seems to be associated with deformation of ground strata leading to horizontal displacements toward the depocenter (Dokka, Sella, and Dixon, 2006; Morton and Bernier, 2010; Psimoulis *et al.*, 2007).

An obvious implication of the results of Parcharidis *et al.* is that rapid ground subsidence may characterize both large and smaller deltas and introduce some geotechnical bias in the estimations of the sea-level rise (*cf.* Venice; Pirazzoli and Tomassin, 2002; Zanello *et al.*, 2011). This is because studies of sea-level changes based on tide gauges (Jevrejeva *et al.* 2008) do not examine this problem since global tide-gauge data sets (<http://www.ioc-sealevelmonitoring.org/>; <http://www.psmsl.org/data/>) do not contain information on the geological/geotechnical background of their stations, and most of these stations are not collocated with Global Positioning System (GPS) stations. Hence it is not easy at present to estimate this bias, which may be important, given the percentage of tide gauges in deltaic sediments in a global scale.

LITERATURE CITED

org/data/) do not contain information on the geological/geotechnical background of their stations, and most of these stations are not collocated with Global Positioning System (GPS) stations. Hence it is not easy at present to estimate this bias, which may be important, given the percentage of tide gauges in deltaic sediments in a global scale.

- Baldi, P.; Casula, G.; Cenni, N.; Loddio, F., and Pesci, A., 2009. GPS-based monitoring of land subsidence in the Po Plain (Northern Italy). *Earth and Planetary Science Letters*, 288 (1–2), 204–212.
- Dixon, T.; Amelung, F.; Ferretti, F.; Novali, F.; Rocca, F.; Dokka, F.; Sella, G.; Kim, S.-W.; Wdowinski, S., and Whitman, D., 2006. Subsidence and flooding in New Orleans. A subsidence map of the city offers insight into the failure of the levees during Hurricane Katrina. *Nature*, 441, 587–588.
- Dokka, R.; Sella, G., and Dixon, T., 2006. Tectonic control of subsidence and southward displacement of southeast Louisiana with respect to stable North America. *Geophysical Research Letters*, 33, L23308, doi: 10.1029/2006GL027250.
- Jevrejeva, S.; Moore, J.C.; Grinsted, A.J., and Woodworth, P.A., 2008. Recent global sea level acceleration started over 200 years ago? *Geophysical Research Letters*, 35, L08715, 4 PP., 2008, doi: 10.1029/2008GL033611.
- Morton, R.A. and Bernier, J.C., 2010. Recent subsidence-rate reductions in the Mississippi delta and their geological implications. *Journal of Coastal Research*, 26(3), 555–561.
- Parcharidis, I.; Kourkouli, P.; Karymbalis, E.; Foumelis, M., and Karathanassi, V., 2013. Time series synthetic aperture radar interferometry for ground deformation monitoring over a small-scale tectonically active deltaic environment (Mornos, Central Greece). *Journal of Coastal Research*, 29(2), 325–338.
- Pirazzoli, P.A. and Tomasin, A., 2002. Recent evolution of surge-related events in the Northern Adriatic area. *Journal of Coastal Research*, 18(3), 537–554.
- Psimoulis, P.; Ghilardi, M.; Fouache, E., and Stiros, S., 2007. Subsidence and evolution of the Thessaloniki Plain, Greece, based on historical leveling and GPS data. *Engineering Geology*, 90, 55–70.
- Stiros, S., 2001. Rapid subsidence of the Thessaloniki (Northern Greece) coastal plain, 1960–1999. *Engineering Geology*, 61, 243–256.

DOI: 10.2112/JCOASTRES-D-12-00134.1 received 13 July 2012; accepted in revision 23 October 2012; corrected proofs received 22 November 2012.

Published Pre-print online 18 December 2012.

© Coastal Education & Research Foundation 2013

-
- Stramondo, S.; Saroli, M.; Tolomei, C.; Moro, M.; Doumaz, F.; Pesci, A.; Loddo, F.; Baldi, P., and Boschi, E., 2007. Surface movements in Bologna (Po Plain—Italy) detected by multi-temporal DInSAR. *Remote Sensing of Environment*, 110(3), 304–316.
- Zanillo, F.; Teatini, P.; Putti, M., and Gambolati, G., 2011. Long term peatland subsidence: experimental study and modeling scenarios in the Venice coastland. *Journal of Geophysical Research F: Earth Surface*, 116(4), art. no. F04002.