

**Numerical modelling of land subsidence related to groundwater overexploitation in the Firenze-Prato-Pistoia basin (central Italy)**

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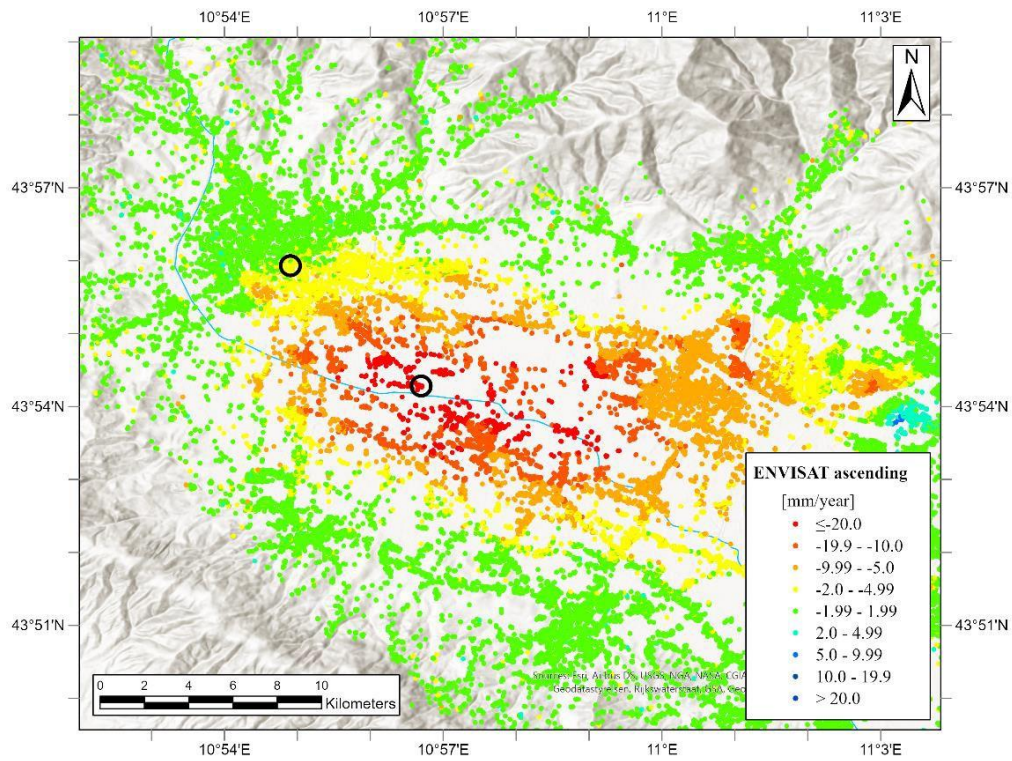
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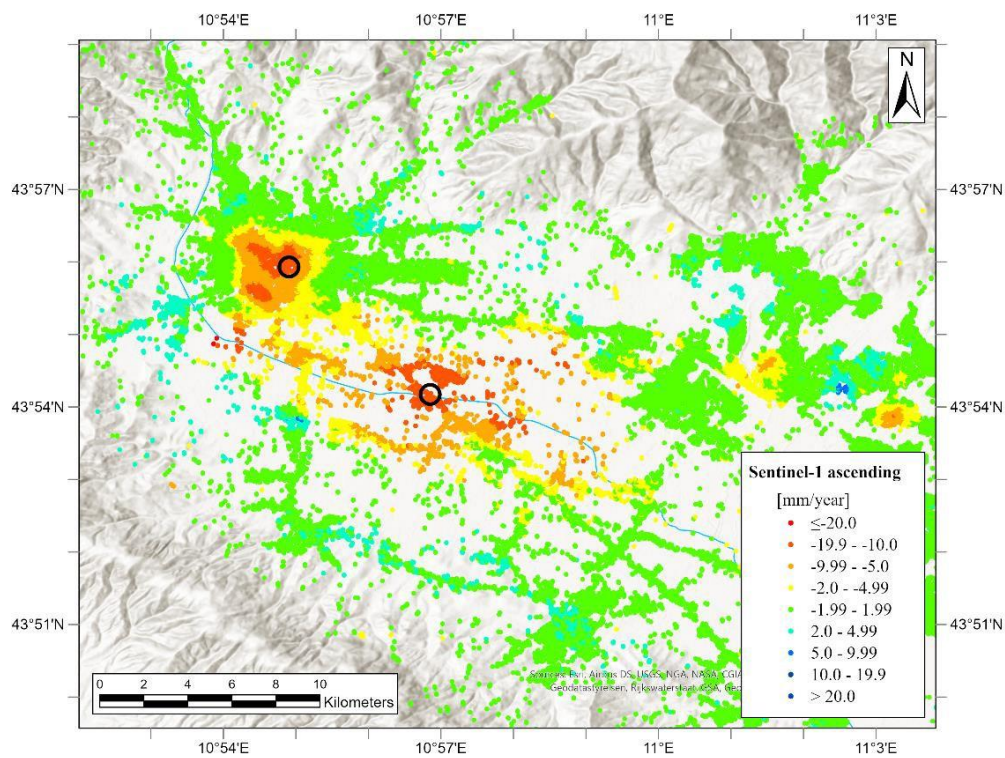
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**Electronic supplementary material – Hydrogeology Journal**



**Figure S1 – ENVISAT velocity map in ascending orbit. The reference period is 2003-2010. The black circles refer to the areas where representative time series are extracted (see section ‘PSI velocity maps’ in the main article).**



**Figure S2 – Sentinel-1 velocity map in ascending orbit. The reference period is 2003-2010. The black circles refer to the areas where representative time series are extracted (see section ‘PSI velocity maps’ in the main article).**

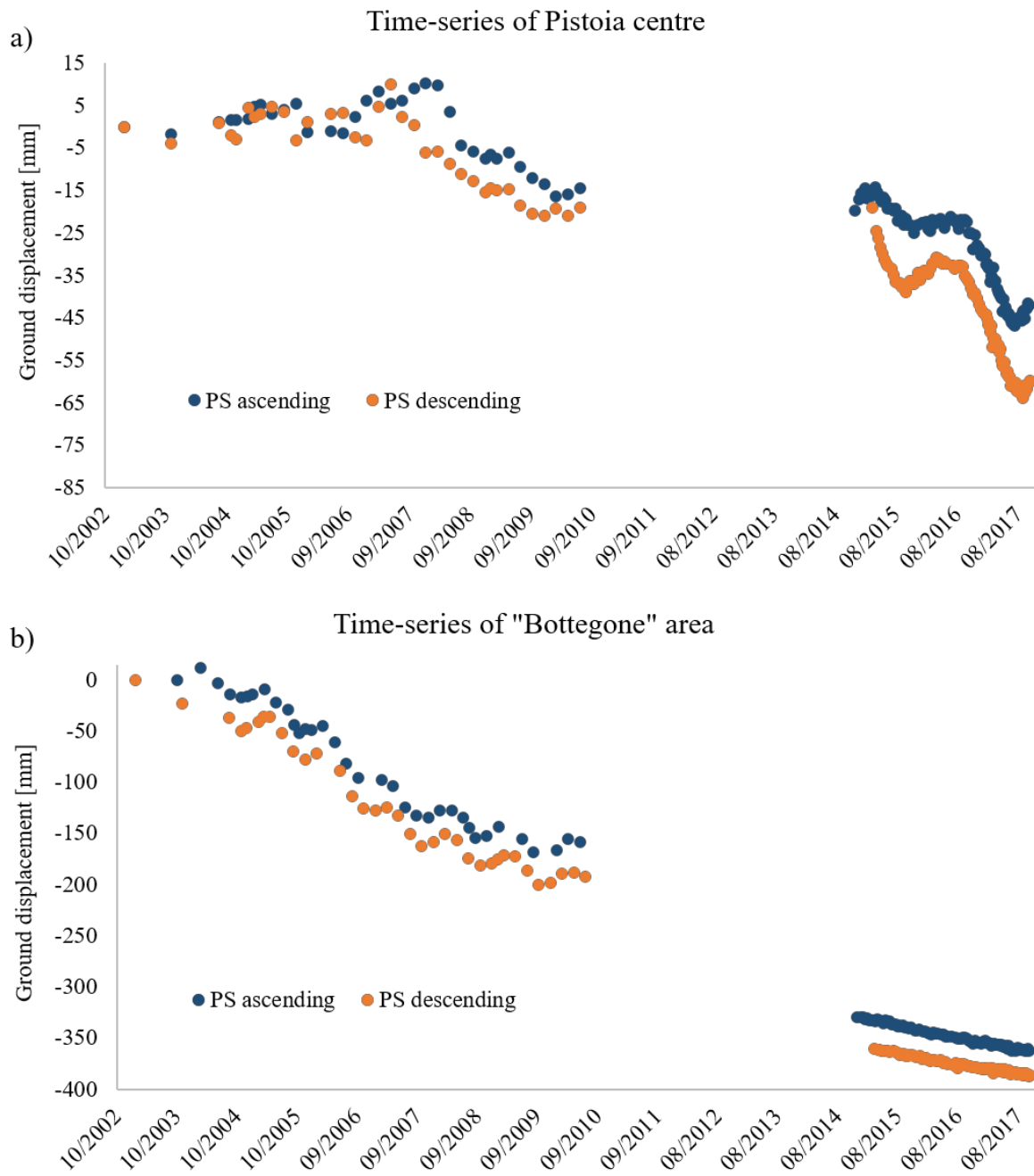
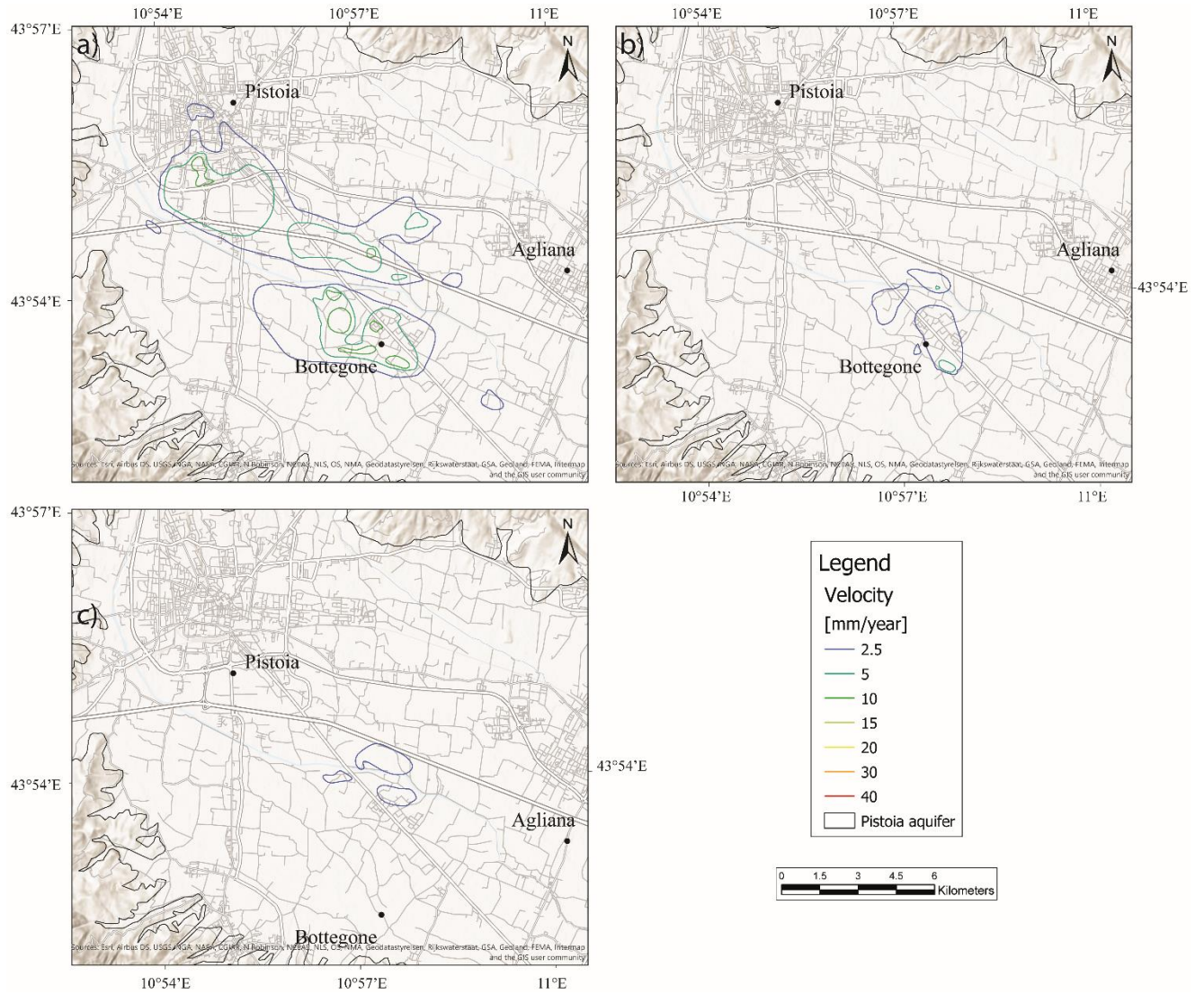


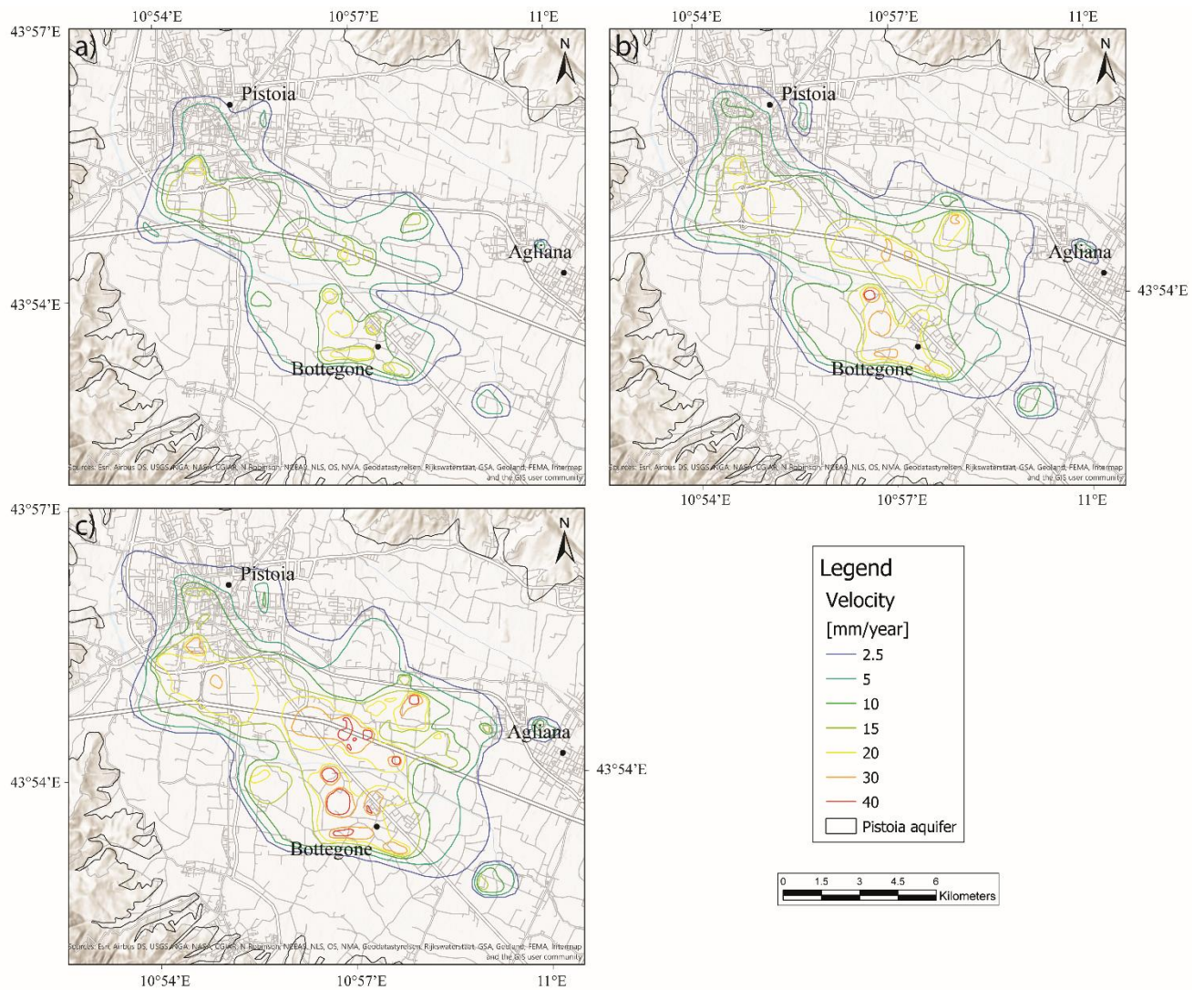
Figure S3 - Reference time series for the (a) Pistoia city center and (b) the area of Bottegone.

**Table S1 – Main characteristics of the PSI datasets used in this work. The MP density is calculated for the area of interest (~350 km<sup>2</sup>) in MP/km<sup>2</sup>. *Minimum coherence* refers to the minimum value of temporal coherence for the datasets. *Velocity std. dev.* and *Velocity range* refer to the value of standard deviation and range in mm/year for all the MP in the area of interest for the four datasets.**

Satellite	Orbit (track number)	Reference period	N° of images	N° of MP	MP density	Minimum coherence	Velocity std. dev.	Velocity range
ENVISAT	A (444)	10/06/2003 27/05/2010	35	52796	150.8	0.6	0.95	-37 - 6.9
	D (394)	10/02/2003 19/04/2010	35	56045	160.2	0.6	0.95	-39.2 - 5.3
Sentinel-1 (SNT-1)	A (117)	12/12/2014 09/10/2017	101	96682	276.4	0.8	0.90	-21.5 – 7.0
	D (168)	22/03/2015 13/10/2017	98	102075	293.2	0.8	0.80	-28.8 - 7.7



**Figure S4 - Time series of forecasted ground displacement in Pistoia area under the increasing pumping rate scenario for a) 2020-2030 period, b) 2030-2040 period and c) 2040-2050 period. Sources: Esri, Airbus DS, USGS, NGA, NASA, N. Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community.**



**Figure S5 - Time series of forecasted ground displacement in Pistoia area under the decreasing pumping rate scenario for a) 2020-2030 period, b) 2030-2040 period and c) 2040-2050 period. Sources: Esri, Airbus DS, USGS, NGA, NASA, N. Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community.**