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Domuyo deformation source from InSAR and Gravimetric data

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In the northwestern area of the Neuquén Province in Argentina (36°16'S–36°54'S), with an elevation of 4709 m a.s.l. the Domuyo volcanic center (DVC) is displaced 70 km towards the east of the south volcanic zone. The magmatic time span represented by the DVC is from 2.5 to 0.11 My (Brousse et al. 1982; JICA, 1983, Miranda 1996, 2006), through which two distinctive compositional stages developed: the first, from the late Pliocene to early Pleistocene, had a calco-alkaline signature with andesitic and explosive eruptions; the second, from middle to upper Pleistocene, is associated with the final development of a complex monogenetic dome structure. No less than 0.1 My activity has been reported until the 2018 when a pattern deformation from InSAR is detected by Lundgren P (2018). An important characteristic of the DVC is the thermal activity that has been studied since the 70s by Palacio et al. (1978), JICA (1983; 1984) and Chiodini et al. (2014) between others. Most of these authors described a fault-controlled system with fumaroles, hot springs and gaysers. Possible reactivation of this volcanic center is proposed by Chiodini et al. (2014) considering the measured energy fluxes which are difficult to reconcile as the result of cooling old magmatic systems.

We present InSAR data and new seismic, gravimetric and magnetic data of the DVC. From the Sentinel-1 data, InSAR processing was made detecting a rate deformation of approximately 13 cm/year from 2014 to at least to 2018 March. A local seismic network detected a series of seismic events during the 2017-2018 period in the southwest flank of the volcanic center, coinciding roughly with the detected thermal activity. A source modeling of the InSAR pattern solves a rectangular source placed about 7 km depth. A negative Bouguer anomaly coincides with the Domuyo edifice, most likely imagining a low-density contrast below the volcano, a 3D density model is presented to discuss the deformation model. The geometry of the source deformation is presented and discussed.

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