# Volcano-tectonic interplay at the Askja volcanic system, Iceland: Finite element modeling constrained by geodetic measurements

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The Askja volcanic system, Iceland is located at the divergent plate boundary, the Northern Volcanic Zone, between the North American and Eurasian plates. A 1.2 km radial levelling line allows for investigation of subsidence or uplift of the caldera, by differencing the end points. Since 1984 the differences have decreased exponentially from -12.6 mm to 5.4 mm in 2015. Several processes are at work at Askja, 1) full plate spreading with 18.4±1.5 mm/yr; 2) a general uplift mostly attributed to glacial isostatic adjustment (GIA) of $\sim$ 9-12 mm/yr; and 3) contraction and magma migration from two magma chambers. The maximum subsidence observed between 2008 and 2013 in the centre of the caldera at the station MASK (Mid Askja) is 11.9±0.1 mm/yr. Correcting this for the GIA uplift, the subsidence is $\sim$24 mm/yr caused by volcano-tectonic deformation processes of Askja. To investigate the volcano-tectonic interplay of deformation processes in the Askja region, we construct a 3D finite element model of the volcanic system, including volcano deformation sources (two magma chambers) and plate spreading.