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Forced Folds and Craters of Elevation in the Afar

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Uplifts caused by magma intrusion have been observed and mapped since the pioneering work of von Buch two hundred years ago. Von Buch's "Craters of elevation theory", developed in the Auvergne and Canaries, was, unfortunately, discredited and mostly forgotten until recent work has shown that the forced folds mapped in seismic sections in sedimentary basins are the same type of feature. Also, these magmatic bulges are being found on an increasing number of volcanoes. The Danakil region of Ethiopia contains a superb range of forced folds with craters of elevation, which we have mapped using Google Earth and other satellite imagery, and some ground truthing. This preliminary work provides a geological map that is inspired from the 1970 Barberi and Vallet map, and which sets out in detail the structure and lava flow units of this area. We describe the main structures of each uplift, and suggest a preliminary general structural evolutionary pattern that provides a model for future research. This work has been untertaken by a group from multiple universities sharing interpretations and data in an open format. We aim to continue this work to study these superb geological features. Their superb nature and preservation is such that we would also press for them to be made a geoheritage reserve of global importance: Either a Geopark or a World Heritage site.