

**3D-GIS AND REMOTE SENSING FOR MODELLING THE SIZE AND EXTENTS OF THE GARDNOS IMPACT STRUCTURE, NORWAY**

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**Introduction:** The Gardnos Structure is ~600 Ma with a diameter ~5km [1], in Hallingdal, Norway (Fig.1). The structure was only properly recognized in 1991 as being of impact origin [1] and had been mapped from the ground, but no Remote Sensing, 3D-GIS or regional-scale modelling had been done [2].

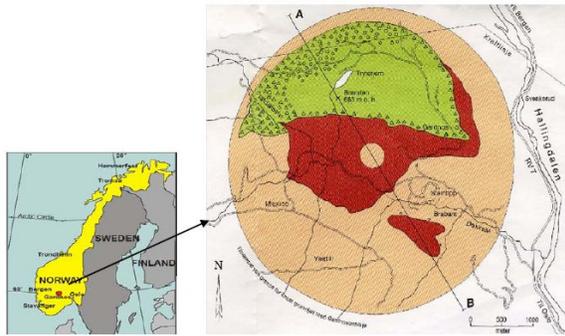


Figure 1. Location of the Gardnos Structure [4].

**Methodology & Results:** Initial field surveys in 2003-2004 using orthophotos to produce a Digital Elevation Model from stereo air photos [2] showed promise (Fig.2). The DEM, in conjunction with age and deformation of the structure applied to complex crater morphologies, suggested that the simplistic circular shape and size of the original map (Fig.1) could be revised and better defined by Remote Sensing.

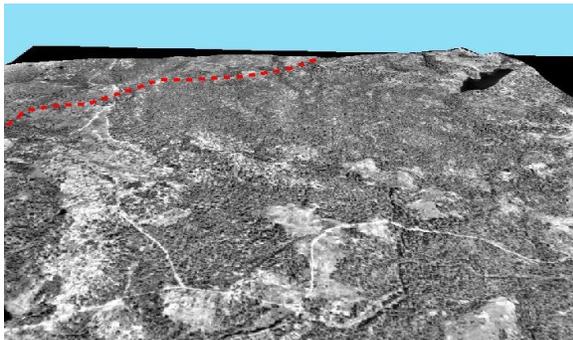


Figure 2. Orthophoto on DEM looking N from above and just W of the central peak. Branden Lake top right; N extent of Gardnos Breccia top left (red dashed line).

The second stage of the work involved construction of a larger DEM from 20m contours (Fig.3) which helped to further reveal structural morphology, faulting, and

the deformed crater signature [3]. On the DEM, lineaments that could be residual/trace-radial faults can be seen to the NW, N and NE. A number of post-Caledonian faults to the W cut across the structure.

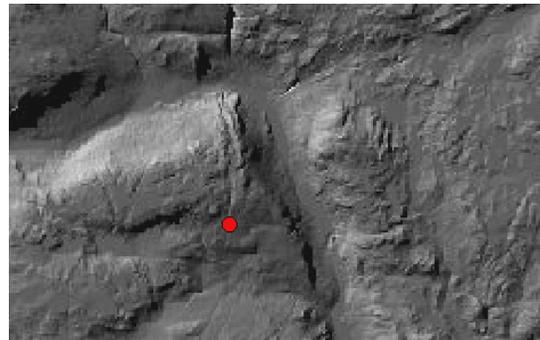
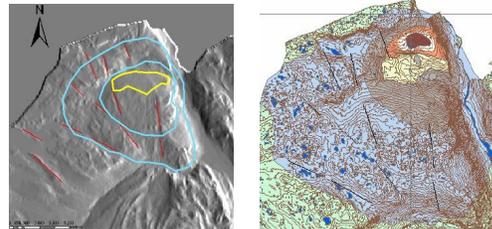


Figure 3. Hill-shaded DEM. Red point is centre of the structure; Hallingdal (valley) to the north and east.

Extents of the structure were fitted to the DEM (Fig.4) and the geological map was added (Fig. 5) [3].



Figures 4 (left) and 5 (right). 3D with geological maps.

**Conclusion:** A 3D geological map [3] confirmed ground-based mapping by other workers [4]. Integration of geological, image and 3D data can help reveal overall structure. Work remains to be done and is in progress, to determine the exact shape and extents.

**References:** [1] Dons, J.A. & Naterstad, J. 1992. *Meteoritics*, 27, 215. [2] Phillips, M.E. 2003. Field and Lab Report, Dept. of Geography, University of Bergen, Norway. [3] Asabi, O. 2007. Unpublished BSc Thesis, University of Greenwich, UK. [4] Kallson *et al.* 2005. Field Report, Lunar and Planetary Institute.

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