THE TWO SUVASVESI LAKES IN CENTRAL FINLAND – A POSSIBLE DOUBLET IMPACT STRUCTURE. S. C. Werner[1], J. Plado[2], L. J. Pesonen[3], and M. Kuulusa[4], [1]*DLR–Institute of Space Sensor Technology and Planetary Exploration, Berlin, Germany (stephanie.werner@dlr.de),* [2]*Department of Geology, University of Tartu, Estonia,* [3]*Department of Geophysics, University of Helsinki, Finland.*

The two Suvasvesi lakes (Suvasvesi North and Suvasvesi South) in Central Finland, Baltic Shield, are located close to the boundary between the Archean Karelian terrane (north) and the Mesoproterozoic Svecofennian terrane (south). The dominant topographic, tectonic and geological features in the region belong to the Raahe-Ladoga fault zone, which crosses Suvasvesi N in a NW-SE direction. Both structures appear morphologically as circular lakes with no islands at their centres. The Suvasvesi N structure is a proven impact structure [1,2] whereas the Suvasvesi S has so far been proposed to be a possible impact structure and could therefore be the second part of the doublet.

The **Suvasvesi N** structure, with a diameter of $\sim$3.5 km, is indicated by a circular weak magnetic relief extending slightly beyond the present lake shore. Close to the centre, almost coinciding with a bathymetric minimum in Kukkarinselkä (depth ca. 90 m), it hosts a small but prominent negative magnetic peak anomaly of 120 nT, as seen in both high and low altitude (150 m and 40 m) airborne as well as in shipborne magnetic surveys. The impact origin is verified by drilling results which revealed a 80 m thick layer of suevitic to suevite melt materials. Petrographic studies of thin sections of the suevite melt pieces show well defined planar deformation features (PDFs) in quartz and zircon grains.

New potential field analysis of the Suvasvesi N (gravity and magnetics) based on petrophysical determinations of the drill core pieces (suscpetibilities about 0.02 SI, densities 2500 kg/m^{-3}, and NRMs 4000 mAm^{-1} with high Q-values (mean 4)) gives a crater diameter of about 3.5 km and a small (D $\sim$0.6 km) melt body causing the observed negative magnetic anomaly in the lake centre. An Euler deconvolution and 3D potential field modelling [3,4] led to a determination of the melt volume (ca. 0.015 km^3) according to morphometric rules. Paleomagnetic data were obtained from the (unoriented) drill core specimens using the VRM-orientation technique of [5] and also using data from optimised magnetic modellings. These data reveal a remanent magnetisation direction for the suevitic melt body with a declination of 214° and inclination of -60°. The corresponding paleopole, when plotted on the new apparent polar wander path (APWP) of Fennoscannia, suggests a possible age of 230–250 or 770–790 Ma for the Suvasvesi N event [2,4].

The lake **Suvasvesi S** structure shows no obvious features in the magnetic data but this maybe due to subdued susceptibility and remanence as often observed in impact structures without distinct melt layers. However, the topographic, bathymetric and the aeroelectromagnetic data point to a subsurface structure centreing to the Haapaselkä area in the lake canter.

Here we present preliminary results from our field trip (summer 2001) to the Suvasvesi S structure. This field trip was made to obtain petrophysical data of the lake shore and island outcrops to support the gravity survey and the possible drilling to Suvasvesi S in the winter 2001/02. We will also discuss the Suvasvesi structures in terms of double cratering mechanism of a doublet case [6], given a special look at the distances and small diameters of the two lakes structures, when compared to other terrestrial doublets, such as the Ries-Steinheim in Germany and the Clearwater W and E in Canada.

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