

Structural Analysis and Remote Sensing of Jabal Waqf as Suwwan Meteorite Impact Crater

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A large meteorite impact structure has recently been discovered in the Middle East, in Jordan (Salameh et al., 2006), at Jabal Waqf as Suwwan (N31°02.9' E36° 48.4'). Jabal Waqf as Suwwan measures about 5.5 km in diameter. Its central uplift of ca. 900 m diameter is extremely well exposed and provides a view through the entire stratigraphic sequence from Mid Cretaceous to early Eocene strata. Since the original regional mapping of Jordan by the German Mission in the 1960s the structure had been known as a cryptovolcanic explosion structure. Initial ground-based investigation resulted in findings of many sites with shatter cones in sandstone and limestone, confirming the impact origin. In addition, limited shock metamorphic deformation in quartz has been reported (Salameh et al., 2006; in press). The age of the crater is currently been unconstrained but must be younger than Eocene.

Here we present results of our May 2008 field campaign that comprised detailed lithological and structural mapping of the entire impact structure with a special focus on the central uplift. Mapping revealed that the central uplift is composed of blocks that range in size between 10 and 150 m. Blocks have minimum sizes in the very center of the central uplift. The blocks are internally coherent, but usually bent or folded. Folding is particularly frequent in the periphery of the central uplift where radially striking synclines and anticlines with steeply plunging fold axis occur. Within the hinges of these Schlingen-folds faults often developed that off-set one of the fold limbs. Overturning of strata and fold axes dominates in two sectors of the central uplift. Systematic deviations from radial symmetry of the central uplift structure are indicative for oblique impact events (Scherler et al. 2006) and will be used to derive the impact vector.

The current study also involves microstructural analysis of samples as well as thorough investigation of available remote sensing data (Landsat TM 5, aerial photographs) of the area. We will show lineament and drainage pattern analysis for the impact structure and the region surrounding it. A digital elevation model including slope analyses will be reported.

References

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