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RIVER AND LAKE ENVIRONMENTS IN THE SOUTHERN AFAR DEPRESSION (ETHIOPIA) – SEDIMENTOLOGICAL STUDIES IN PLIOCENE HOMINID-BEARING DEPOSITS

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Since 2000, the International PaleoAnthropological Research Team under the leadership of Horst Seidler has been investigated the Plio-Pleistocene sediments around Mount Galili in the southern Afar Depression. The research area is located 100 km towards the NEE of the Awash Railway Station, E of the National Road No. 8, in the district of the village Gadamaitu (N 9°44.101', E 40°27.368', Fg. 1). The Mount Galili is the most conspicuous elevation in the center of the research area. The deposits build up the eastern rift shoulder of the N-S striking, recently active graben structure of the Main Ethiopian Rift. The region, extensively faulted by N-S striking normal faults, exposes a 125 m thick sedimentary succession. The Mount Galili Formaton has been divided into five members comprising volcanic layers with different lithologies such as ignimbrites, basalts and tuffs (Fig. 1). The volcanic succession shows the typical bimodal chemistry of rift zones. The Mount Galili Formation represents a sequence of fluvio-lacrustrine sediments keeping interruptions due to volcanic events. At the moment, the facies analysis is based on 21 lithostratigraphic sections (Fig. 1) using the volcanic layers as marker beds for correlation.

Multi-colored, clayey sequences with abundant fossil remains of fishes, turtles and crocodiles with only minor content of sand and coarse silt characterize typical lacrustrine sediments, such as observed in the Shabeley Laag Member. Thin, whitish micritic limestone beds (Dhidinley Member) as well as white diatomite layers (Satkawini area, NE of Fig. 1) represent water highstands. Cellular limestones with desiccation cracks are also observerd in the Dhidinley Member. Extended gastropod-limestones represent a nearshore facies (Shabeley Laag, Caashacado Member), composed of *Bellamya, Melanoides, Cleopatra,* exclusively preserved as casts (Ch. Frank, unpub. report). Grey, gypsum-bearing, clayey sediments mark water lowstands with saline conditions. It seems, that changes in the water level also influence the salinity of the lake. Successions of grey to brownish silty deposits with thin sand layers represent mudflats, deposited at nearshore areas under the influence of river mouths and alluvial fans.

The fluvial deposits are characterized by sandy channel-fills cutting into the lacrustrine facies. The channel-fill deposits consist of grey to bluish feldspatic sands with cross-bedding showing current directions towards the N and E. The sand is well to moderate sorted and symmetrically to fine-skewed. These sands were preferentially deposited in fluvial channels with a permanent current strong enough to keep the suspension load in motion. Sediments from channels with weaker current conditions are marked by a higher content of the suspension fraction documented by a pronounced fine tail of the cumulative curve. Channel-fill deposits are exposed in the Dhidinley and Shabeley Laag Member.

Sheet flood deposits represent another important sediment type. Their bimodal grain size distributions show evidence of sedimentary reworking. The sediments are a mixing product of reworked stream bars (gravel to sand) and flood plain sediments (fine fraction). The occurrence of sheet flood deposits demonstrates that parts of the fluvial system became periodically (seasonally) dry. This facies is observed in the central area of the Shabeley Laag Member, immediately below the Galili Basalt, where findings of primate and hominid teeth

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have been made. Flood plain deposits predominantly consist of grey to brownish fine sands and silts with lots of rhizolitic structures. The differentiation between overbank and mudflat deposits is sometimes delicate.

The Pliocene river and lake system of the Mount Galili Formation with seasonal dry periods was the habitat of a rich mammal fauna and the early man (*Australopithecus afarensis* , see poster of Urbanek, Kullmer et al.).

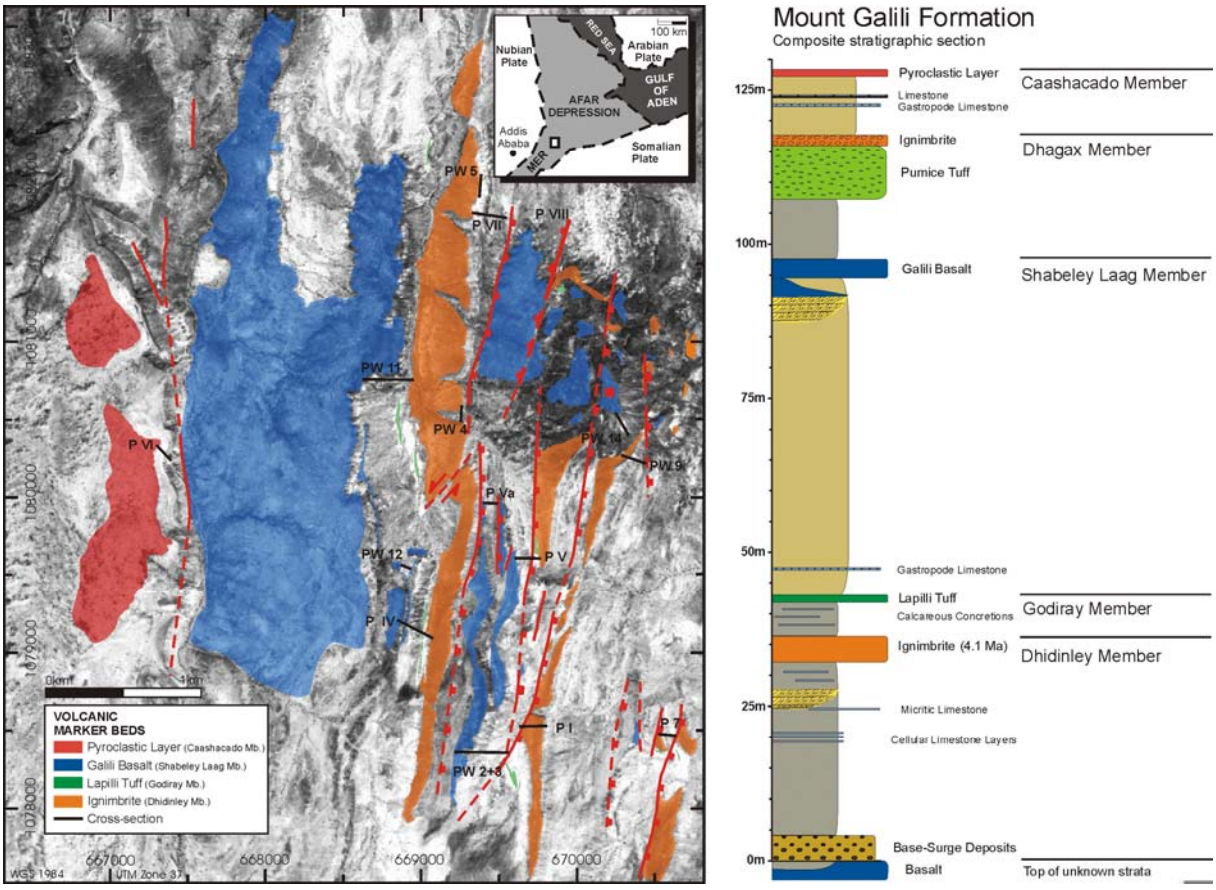

Fig.1: Geological sketch map of Galili research area and composite lithostratigraphy of the Mount Galili Formation.