

## **SANDVOLCANOES IN THE MUTH FM., N-INDIA: EVIDENCE FOR PALAEOSEISMICITY IN A DEVONIAN BARRIER ISLAND ENVIRONMENT.**

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The Muth Formation is part of the huge sedimentary successions of the Tethyan Zone at the northern margin of the Indian plate ranging from Precambrian to Eocene in age and has been traced throughout the whole NW Himalayas, from Kashmir to Nepal. The formation is devoid of body fossils, but from the stratigraphical position an Early to Middle Devonian age is probable. Sections of the Muth Formation in the Pin Valley reveal diversified sedimentary structures in the quartz-arenite. Four different facies associations are recognized. FA1 and FA4 comprise mainly horizontally laminated arenites that are tentatively interpreted as shore face sediments. FA3 forms a thin striking horizon of fine-grained dolomites within the quartzites and probably represent quiet-water lagoonal deposits. Below this dolomitic horizon the pure arenites of FA2 consist mainly of large-scale cross-beds up to 4.5 m in thickness, probably of coastal dune origin. Water-escape structures like spring pits, sand volcanoes and sand dykes are present everywhere in the section, but they accumulate in FA4. Sand dykes form a pattern of sub-vertical planes with two preferred directions. In the section at Muth probably seismically triggered diatremes of sand volcanoes appear directly below the fine-grained dolomitic horizon possibly sealing the arenites prior to the formation of the sand volcanoes. These water-escape structures could indicate tectonic instability and N-S directed extension near the beginning of the transgression of the overlying Lipak Formation.