



Coastal chevron deposits – sedimentology, methods and aeolian versus tsunamigenic origin

Michaela Spiske (1), Anna-Marietta Garcia Garcia (1), Sumiko Tsukamoto (2), and Volkmar Schmidt (3)

(1) Institut für Geologie, Westfälische Wilhelms Universität, Münster, Germany (spiske@uni-muenster.de, tel. +49/251/8333968), (2) Leibniz-Institut für Angewandte Geophysik, Hannover, Germany, (3) Institut für Geophysik, Westfälische Wilhelms Universität, Münster, Germany

The origin of v-shaped sediment bodies, so-called “chevrons”, is currently controversially discussed. The term “chevron” is presently only defined in terms of the morphology of the sediment body, but not in terms of its genesis. Both an aeolian and an impact-tsunami origin are discussed. In this study, the sedimentology and origin of chevrons is investigated, examining deposits from the US west coast and the coast of Western Australia.

We use internal structures obtained in trenches or by ground penetrating radar surveys, trenches, ages gained by radiocarbon and optically stimulated luminescence dating, grain size analysis and the general sediment composition. If the chevrons were deposited by a tsunami, all chevrons along one coastline should possess the same depositional ages, the grain-size distribution should be polymodal indicating various sediment sources and internal structures should be restricted mainly to normal grading. In case of an aeolian origin, the ages of the individual chevrons may vary and internal ages will reflect the migration of the sediment body. Furthermore, cross bedding should be present throughout the sediment body and soil horizons may represent inactive phases.

Preliminary results indicate the presence of internal cross bedding and an unimodal grain-size distribution of the surveyed chevrons. Ages decrease in landward transport direction and to the top within vertical successions. At some locations soil layers intercalate between well sorted sands. The mean grain size of the chevron sands is 0.11-0.25 mm. A comparison of the chevron components with the mineral content of possible sediment sources (e.g., rivers, beaches, cliffs) shows that the chevrons are composed of the fine grain size fraction of the respective sources. Sediments of this grain size can easily be transported by aeolian forces under the local prevailing wind conditions. Terrestrial gastropods found within the chevrons give evidence of a long term development of these sediment bodies. Therefore, results of this study point rather to an aeolian than a tsunamigenic origin of the surveyed chevrons.