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Coastal evolution of the Sultanate Oman (Arabian Peninsula) - tectonic versus sea-level forcing

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Abstract
Along the coastline of the Sultanate of Oman (SE Arabian Peninsula) we find geological evidences for tsunamis, neotectonic movements and differential crustal uplift. These evidences are used to describe the Quaternary evolution of the coastline and to construct future scenarios.
Coastal areas are dynamic and fast changing natural environments. Several factors, acting on different time scales control their evolution. Furthermore, coastal areas are densely populated, especially in the Sultanate of Oman where more than half of the population is living at the coast. Due to economic improvements Oman experiences substantial changes in land utilization, particularly in Al Batinah and Muscat regions. With the given natural boundary conditions different interests of various user groups are in conflict. Ongoing global climate change will result in further intensification of the situation.
Coastal evolution is a function of several forcing factors e.g.: differential land movement which in turn is an effect of local variations in the tectonic stress field; climate and sediment availability. The various forcing factors are quantified by analysing Quaternary coastal sediments and geomorphologic features (e.g. terraces, notches) as archives and indicators. Long-term changes are described by the reconstruction and comparison of the relative sea-level development along the coastline. Short-term coastal changes are often related to natural hazards. Hurricanes as well as tsunamis are known to have affected Oman's coastline in the past. By analysing geological archives information regarding recurrence intervals and potential damages are revealed which allows assessing the risk and estimating the vulnerability. This is done for different areas along the coast which have been identified as key-locations. Sediment cores and ground-penetrating radar (GPR) surveys are used to analyse Quaternary coastal sediments.