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Structural evolution of the Namakdan salt diapir in the Zagros fold-thrust belt: The Persian Gulf, Iran

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Intersalt and host roch structures of the the Namakdan diapir were studied and compared with available 14C and OSL dated sediments to determine the structural evolution and uplift pattern of the diapir. The Namakdan salt diapir is situated on Qeshm Island in the east of the Zagros fold-thrust belt of Iran, north of the Persian Gulf. This nearly circular diapir with $\sim$ 7 km diameter penetrates the crest of Salkh anticline and is embedded by steep-dip bedding of the Miocene Mishan and Aghajari Formations, which demonstrates the concentric internal structure of the diapir. The intraformational unconformities of country rocks were developed due to the Zagros shortening and salt diapirism, which demonstrate their syn-tectonic sedimentation. In addition, the dip of these unconfromities and also bedding of the country rocks decrease upward. The Namakdan diapir is partly covered by gypsum/anhydrite residuals, dolomite, marine limestone, and tilted marine terraces. The salt belong to the Hormuz Complex, consisted of predominantly halite, gypsum, anhydrite, dolomite, shale, sandstone, and volcanic-volanoclastic blocks, which was deposited in the Late Proterozoic-Middle Cambrian evaporitic rift basins. The Hormuz Complex is not only the cause of many salt diapir oil/gas fields but is also considered to have been a major source rock for generation of younger reservoirs. Thus, the salt diapirs of the Zagros play an important role in generation of the oil/gas reservoirs in this strategic area, so determination of structural style and evolution of the salt diapirs are vital in oil/gas exploration and development.
The upright folds are developed in the salt beds due to upward movement and minor extrusion of the salt rocks due to its low viscosity. The dip of country rock beds increase toward to the diapir rim, so that the beds shows a vertical and even overturned attitude in vicinity of the diapir. Differential uplift pattern of the diapir was deduced in rim-to-center pro[U+FB01]les by detailed structural analysis of the salt and the country rock attitudes. The estimated uplift rate is higher in the northern and southern rim of the diapir, which should be the result of regional uplift due to Zagros shortening. The results are consistent with the calculated uplift rates of previous researchers, which increase from $\sim$1–3 mm/yr at rim to $\sim$3–5 mm/yr at centre of the diapir. In study of the salt diapirs, however, the ages of initiation of salt instability, diapir exposure, salt extrusion, and orogenic pulses should be considered in the orogenic belt. The structural evolution of the Namakdan diapir, which is strongly affected by the regional uplift and geological settings, applicable to other salt diapirs of the orogenic fold-thrust belts.