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Link between Neogene and modern sedimentary environments in the Zagros foreland basin

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The Zagros mountain belt, with a length of 1800 km, is located in the south of Iran and was produced by collision between the Arabian plate and the Iran micro plate some time in the early Tertiary. After collision, the Zagros carbonate-dominated sedimentary basin has been replaced by a largely clastic system. The Neogene Zagros foreland basin comprises four main depositional environments which reflect the progressive southward migration of the deformation front with time. The oldest unit - the Gachsaran formation - is clastic in the northern part of the basin, but is dominated by evaporates in southern part, being deposited in a supratidal Sabkha-type environment. Overlying the Gachsaran is the Mishan formation, which is characterized by the Guri limestone member at the base, overlain by marine green marls. The thickness of the Guri member increases dramatically towards the southeast. The next youngest unit is the Aghajari Formation which consists of well sorted lenticular sandstone bodies in a red silty-mudstone. This formation is interpreted as representing the floodplain of dominantly meandering rivers. Finally, the Bakhtiari formation consists of mainly coarse-grained gravel sheets which are interpreted to represent braided river deposits. Each of these Neogene depositional environments has a modern day equivalent. For example, the braided rivers presently active in the Zagros mountains are modern analogues of the Bakhtiari. In the downstream direction, these braided rivers become meandering systems, which are equivalents of the Aghajari. Eventually, the meandering rivers meet the Persian gulf which is the site of the ‘modern day’ Mishan shallow marine marls. Finally, the modern carbonate system on the southern margin of Persian Gulf represents the Guri member paleo-environment, behind which Sabkha-type deposits similar to the Gachsaran are presently being deposited. One important implication of this link between the Neogene foreland basin deposits and the modern environments is that all formation boundaries are strongly diachronous. Thus, for example, although the Mishan is Burdigalian-Messinian in regions where it is currently undergoing subaerial erosion in the Fars zone, it is presumably still forming today in the modern Persian gulf foredeep.