

Application of C-O isotopes in the recognition of dolomites origin in the Upper Paleocene sediments of NE Iran

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The Upper Paleocene (Thanetian) carbonate sediments of the Chehel-Kaman Formation are exposed along the NW-SE trending anticlines and synclines in the Kopet-Dagh Basin in NE Iran. Carbon-Oxygen isotopes analysis reveal that the oxygen isotope ranges from -8.77‰ to +0.92‰ PDB and the carbon isotope ranges from +1.18‰ to +3.5‰ PDB. Comparison between our results with what have been reported from the other parts of the world showed that these dolomites can be divided into two different types. Type one consists of fine crystal dolomite with O isotope heavier than -2.5‰ PDB. These dolomites formed in the lower temperature environment, probably in the supratidal flat. The calculated temperature from these dolomites is about 26°C. The type two is composed of coarser crystal with O isotope lighter than -6.5‰ PDB. These dolomites formed in the higher temperature, probably during the burial stages of the Upper Paleocene sediments. The calculated temperature during the formation of these dolomites is about 72°C. In addition, CL studies showed that the type one does not have any luminescence which is related to oxygenated environment, while the type two does have luminescence and showed that they formed in the more reducing condition. Therefore, based on different isotopic, petrographic and CL characteristics, two types of dolomites can be distinguished in the Upper Paleocene interval in NE Iran that formed in different geochemical conditions.