



Paleoproductivity of the Gurpi Formation at its type section

E. Zarei and E. Ghasemi-Nejad

Department of Geology, Faculty of Sciences, University of Tehran, Iran (Zarei@khayam.ut.ac.ir)

The type section of the Gurpi Formation which is located in Anbar-e-Sefid Valley near to Lali city is about 182 m thick and consists of calcareous shales and black shales. The formation lies with an erosional disconformity on Ilam Formation and turns gradually to the purple shales of the overlying Pabdeh Formation. The Gurpi Formation was dated late Campanian to late Paleocene based on the presence of foraminifer species *Globotruncana calcarata* and dinocyst species *Odontochitina porifera* in the lowermost parts and foraminifer species *Morozovella velascoensis* in the uppermost parts of the section. The Cretaceous / Tertiary boundary (KTB) is placed some 57 meters below the Gurpi and Pabdeh contact within the black shales of the Gurpi Formation. In order to study paleoproductivity of the Gurpi Formation the authors examined many different factors including changes in ratio of Peridinioid to Gonyaulacoid (P/G) dinoflagellate cysts. Peridinioid dinocysts are stenotopic forms and are usually used for this purpose but one has to determine whether their absence in sediments is because of original absence during depositional period or because of bad preservation and destruction after their production and during depositional period. Thus factors related to state of preservation of the organic matters including “lability” and ratio of structureless organic matter (SOM) to marine palynomorphs were calculated for the samples throughout the stratigraphic column. In addition four different indices were also calculated for paleoproductivity condition. These include: ratio of Peridinioid to Gonyaulacoid (P/G) dinocysts, ratio of dinocysts indices for outer neritic to those of inner neritic, ratio of terrestrial to marine elements (T/M), and ratio of planktonic to benthonic foraminifera. Based on these factors three biofacies and two subfacies were recognized and differentiated. The first facies (I) is marked by the low state of preservation of organic residue, low lability and a relatively high ratio of SOM to marine elements. The ratio of Planktonic to benthonic (P/B) is relatively high, abundance of deep-water benthonic foraminifera and dinocysts indices for outer neritics such as *Impagidinium*. Absence of peridinioids is more probably because of their bad state of preservation. In biofacies II preservation of organic matter is much better (higher lability, and low ratio of SOM to marine palynomorphs). Altogether production of organic matter is much higher in this facies. In biofacies III presence of cold-water foraminifera and dinoflagellate cysts indicate presence of cold-water currents at the beginning of Paleocene. Presence of phosphates and glauconites and abundance of ecological generalist foraminifera indicate that the absence of the Peridinioid dinocysts is related to reduction in temperature and lack of suitable condition for their propagation.