P02

Biostratigraphy and Palaeoenvironments of the Middle Jurassic Dhurma and Sargelu Formations, Onshore Kuwait

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SUMMARY

The study of fifteen cored wells shows calcareous shales, with occasional limestone interbeds, changing into alternations of wackestones, mudstones and packstones in the upper part, characteristic of the Dhurma and Sargelu formations respectively. Biostratigraphic analysis recognise moderate-abundant calcareous nannofossils and palynomorphs in the Dhurma and lower part of Sargelu, whereas benthonic and planktonic foraminifera are more frequently found in the Sargelu. The Dhurma Formation is Early-Late Bajocian, Zone NJT10 on the basis of the FO of *W. manivitae* and *D. sellwoodii* and the LO of *C. superbus*. The overlying Sargelu is Late Bajocian to Callovian since the LO of *C. magharensis* and FO of *G. calloviensis* occur in the lower half of this Formation.

Micropaleontological assemblages, together with paleoenvironmental marker species enable to interpret variations from inner-middle neritic during the Bajocian, attaining outer neritic in the Bathonian-Early Callovian, with the deepest conditions observed towards the west, returning to shallower inner neritic conditions in the Callovian. These infer two major flooding surfaces during the deposition of these formations. Combined to a greater chronostratigraphic constraint, palaeobathymetry could provide significant insights to Jurassic history of the Arabian Plate, where local subsidence and/or tectono-eustatic controls influenced the depositional cycles observed within these units.

Biostratigraphic analyses of fifteen cored wells show that the Middle Jurassic interval in onshore Kuwait is composed of calcareous shales, with occasional limestone interbeds in the lower part, changing into alternations of wackestones, mudstones and packstones in the upper part, characteristic of the Dhurma and Sargelu formations respectively. The boundary between the two formations is not conspicuous, being for this reason informally termed the Sargelu-Dhurma Transition.

The succession is characterized by moderate to abundant calcareous nannofossils and palynomorphs in the Dhurma and Lower part of Sargelu, whereas benthic and planktonic foraminifera are more frequently found in the upper part of the Sargelu Formation. The Dhurma Formation is Early to Late Bajocian in age, corresponding with Zone NJT10a of Mattioli and Erba (1999) on the basis of the FO of nannofossil *W. manivitae*, the LO of nannofossil *C. superbus* and the FO of dinoflagellate *Dichadogonyulax sellwoodii*.

The overlying Sargelu Formation is Late Bajocian to Callovian in age since the LO of *C. magharensis* (Late Bajocian), is observed in the lower Sargelu and the FO of *G. calloviensis*, of Early Callovian age (Boudagher-Fadel, 2012) is consistently found in the upper half of this Formation.

Micropaleontological assemblages, together with paleoenvironmental marker species enable to interpret palaeoenvironmental variations from inner – middle neritic during the Bajocian, attaining outer neritic conditions in the Bathonian – Early Callovian, with the deepest conditions observed towards the west of the study area, and returning to shallower inner neritic conditions in the rest of the Callovian. These palaeobathymetric determinations allow identifying two major flooding surfaces during the sedimentation of these formations, which could correspond to the J20 and J30 of Sharland et al. (2001), of Bajocian and Bathonian age respectively. Combined to a greater chronostratigraphic constraint, these palaeobathymetric fluctuations could provide significant insights to the Jurassic history of the Arabian Plate, where local subsidence as well as tectono-eustatic controls influenced the depositional cycles observed within these units.

References

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