Shallowing-Upward Sequences in Late Middle Permian (Midian) Alatoconchid-Bearing Strata, Khao Khwang Carbonate Platform, Central Thailand

Mongkol Udchachon¹, Chongpan Chonglakmani², Hamish Campbell³, and Hathaithip Thassanapak⁴

¹ Palaeontological Research and Education Centre, Maharakham University, Maharakham 44150, Thailand

² School of Geotechnology, Institute of Engineering, Suranaree University of Technology, Nakhon Ratchasima 30000, Thailand

³ GNS Science, PO Box 30368, Lower Hutt, New Zealand

⁴ Department of Biology, Faculty of Science, Maharakham University, Maharakham 44150, Thailand
Corresponding e-mail: mongkol.c@msu.ac.th

Extensive field work to establish the occurrence and distribution of Permian alatoconchid-bearing strata in Thailand has been carried out in recent years. Alatoconchid faunas occur in limestone sequences within both the Indochina and Sibumasu (Shan-Thai) Terranes. In the Indochina Terrane, they were found in Khao Khwang and Pha Nok Khao platforms of the Saraburi Group. In the Sibumasu Terrane they were observed in carbonate platform sequences in the Ngao, Ratburi and Chantaburi Groups in northern, western and eastern Thailand, respectively.

The current research has been carried out in the Saraburi Group. The key localities include Khao Somphot, Pak Chong and Tha Sa-ad sections in Lopburi, Nakhon Ratchasima and Loei areas, respectively. Microfacies study and palaeontological data indicate that shallow marine environments of deposition prevailed at all of these localities during Middle Permian time. In addition, evidence of occasional storm events and subaerial exposure were observed within shallowing-upward sequences at Khao Somphot.

Two major unconformities are recognized in the Khao Somphot section. These unconformities indicate subaerial exposure of the carbonate platform. Unconformity is recognised on the basis of features such as karstification, collapse breccia, and intra-formational breccia within channel conglomerate. Collapse breccia is inferred to have developed under conditions of sea-level low stand during middle to late Midian time. The latter may have been initiated by successive sea-level fall during this time interval. The timing and duration of this event is compatible with global sea-level curves (e.g., Vail et al., 1977; Ross and Ross, 1987). The occurrence of key taxa such as *Lepidolina*, *Yabeina*, *Colania*, *Sumatrina*, *Conodofusiella* indicates a Midian (Capitanian) age.

Small-scale shallowing-upward sequences of carbonate strata have been recognised in Khao Somphot section. They are represented by limestones and dolomite or dolomitic limestone couplets, and limestones and laminated limestone couplets. Microfacies study was used to confirm composition and texture of the rocks. Two main types of parasequence were differentiated including peritidal and subtidal parasequences. The peritidal parasequence types are characterised mainly by intertidal facies overlain by subtidal facies. The intertidal facies include tidal flat mudstone, fenestral mudstone, laminated bindstone, fenestral bindstone and dolomitic limestone. This peritidal sequence can be compared to an ideal section of Lofer Cycles. Subtidal parasequences comprise four main types of deeper subtidal facies which are directly overlain by shallower facies. They comprise alatoconchid biostrome overlain by grainstone, coral biostrome overlain by coated grainstone, fusulinid wackestone overlain by fusulinid grainstone, and crinoidal packstone overlain by fusulinid packstone.

Keywords; Microfacies, shallowing-upward sequence, carbonate platform, alatoconchids, Middle Permian