Journal of Asian Earth Sciences 37 (2010) 275–285

Contents lists available at ScienceDirect

Journal of Asian Earth Sciences

journal homepage: www.elsevier.com/locate/jseaes

Microfacies and depositional environment of the Cenomanian of the Bangestan anticline, SW Iran

Ali Ghabeishavi [a], Hossein Vaziri-Moghaddam [a,*], Azizolah Taheri [b], Farid Taati [c]

[a] Department of Geology, Faculty of Sciences, University of Isfahan, Isfahan 81746-73441, Iran
[b] Geology Department, Faculty of Earth Science, Shahrood University of Technology, Shahrood, Iran
[c] National Iranian Oil Company, Exploration Directorate, Tehran, Iran

ARTICLE INFO

Article history:
Received 25 May 2008
Received in revised form 3 August 2009
Accepted 26 August 2009

Keywords:
Bangestan anticline
Sarvak Formation
Sedimentary environment
Cenomanian
Zagros basin

ABSTRACT

The Sarvak Formation (Albian to Turonian in age) of the Zagros basin is a thick sequence of shallow-water carbonates. This work focuses on the microfacies and sedimentary environment of the margin of the Cenomanian intrashelf basin. In the study area (southwest of Iran), the Sarvak Formation is subdivided into 12 microfacies that are distinguished by petrographic analysis on the basis of their depositional textures and fauna. In addition, four major depositional environments were identified in the Sarvak Formation. These include shelf lagoon, platform margin, slope and basin environmental settings, which are interpreted as a carbonate shelf without an effective barrier separating the platform from the open ocean.

1. Introduction

The Sarvak Formation, which is of Albian to Turonian age (Motiei, 1993; Wynd, 1965; James and Wynd, 1965), is one of the most prolific oil reservoirs in southwest Iran (Fig. 1). It was deposited on a carbonate platform developed across the elongated Zagros basin (Figs. 2 and 3). Studies of the Sarvak Formation have focused mainly on lithostratigraphy, biostratigraphy and palaeontology (e.g., Wynd, 1965; James and Wynd, 1965); however, detailed sedimentological and microfacies work is still needed.

Sarvak sedimentation in the north and south of Khuzestan (Izeh and Dezful Embayment) took place under "shelf" conditions, while in the middle, it was separated by a "graben"-like feature in which the sedimentation of the thin-bedded oligostegina limestone accrued (Hart, 1970b) (Fig. 4). This "graben"-like feature was later interpreted as an intrashelf basin (Van-Buchem et al., 2006).

During Aptian–Albian–Cenomanian times, the eastern part of the Arabian Plate (southwest Iran) was characterized by large intrashelf basins surrounded by shallow-water platforms. The sediments of the Sarvak Formation were deposited on platforms and within the intrashelf basin on the passive margin of the Arabian Plate (Ziegler, 2001).

The accumulation of rudist debris at the shelf margin (around the intrashelf basin) of Sarvak is one of the oil prospects in the Izeh and Dezful Embayment. Thus, analyzing the facies distribution and sedimentary environments of the Sarvak shelf margin around the intrashelf basin has important implications.

This study considers the Sarvak Formation in the Bangestan anticline (Fig. 3) in the northern margin of the Cenomanian intrashelf basin (Fig. 4). The aims of this paper are to describe and interpret the different microfacies using both field and petrographic observations and recognition of the depositional environment of the Sarvak Formation. To achieve these aims, one section at Tang-e Sarvak in the Bangestan anticline (the northern margin of the Cenomanian intrashelf basin, Sarvak type section) was selected.

2. Methods and study area

Field and petrographic studies were carried out for facies analysis and palaeoenvironmental reconstruction of the Sarvak Formation. Facies definition was based on microfacies characteristics, including depositional texture, grain size, grain composition and fossil content. The classification of carbonate rocks followed the nomenclature of Dunham (1962) and Embry and Klovan (1971).

The study area (Bangestan anticline) is located about 7 km from the town of Likak. A section was measured in detail at 30°58.98′N and 50°7.84′E (Fig. 3). More than 400 samples from the Sarvak Formation were studied. Some samples from the underlying Kazhdumi Formation were also analyzed for comparison.

* Corresponding author. Tel.: +98 311 7932160; fax: +98 311 7932153.
E-mail address: avaziri730@yahoo.co.uk (H. Vaziri-Moghaddam).

1367-9120/$ - see front matter © 2009 Elsevier Ltd. All rights reserved.
doi:10.1016/j.jseaes.2009.08.014

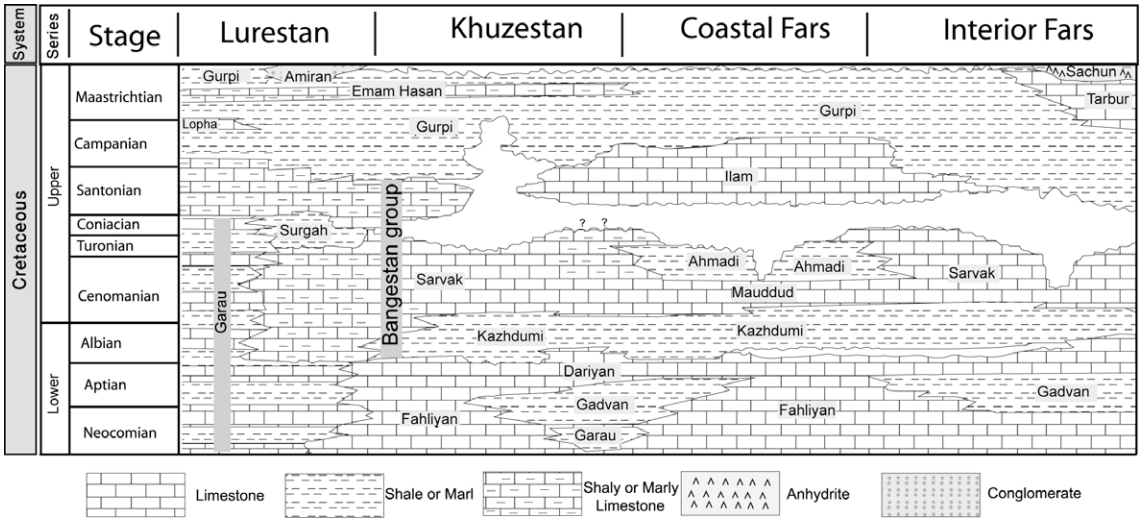

Fig. 1. Correlation chart of Cretaceous strata, Zagros basin, Iran (adapted from James and Wynd, 1965).

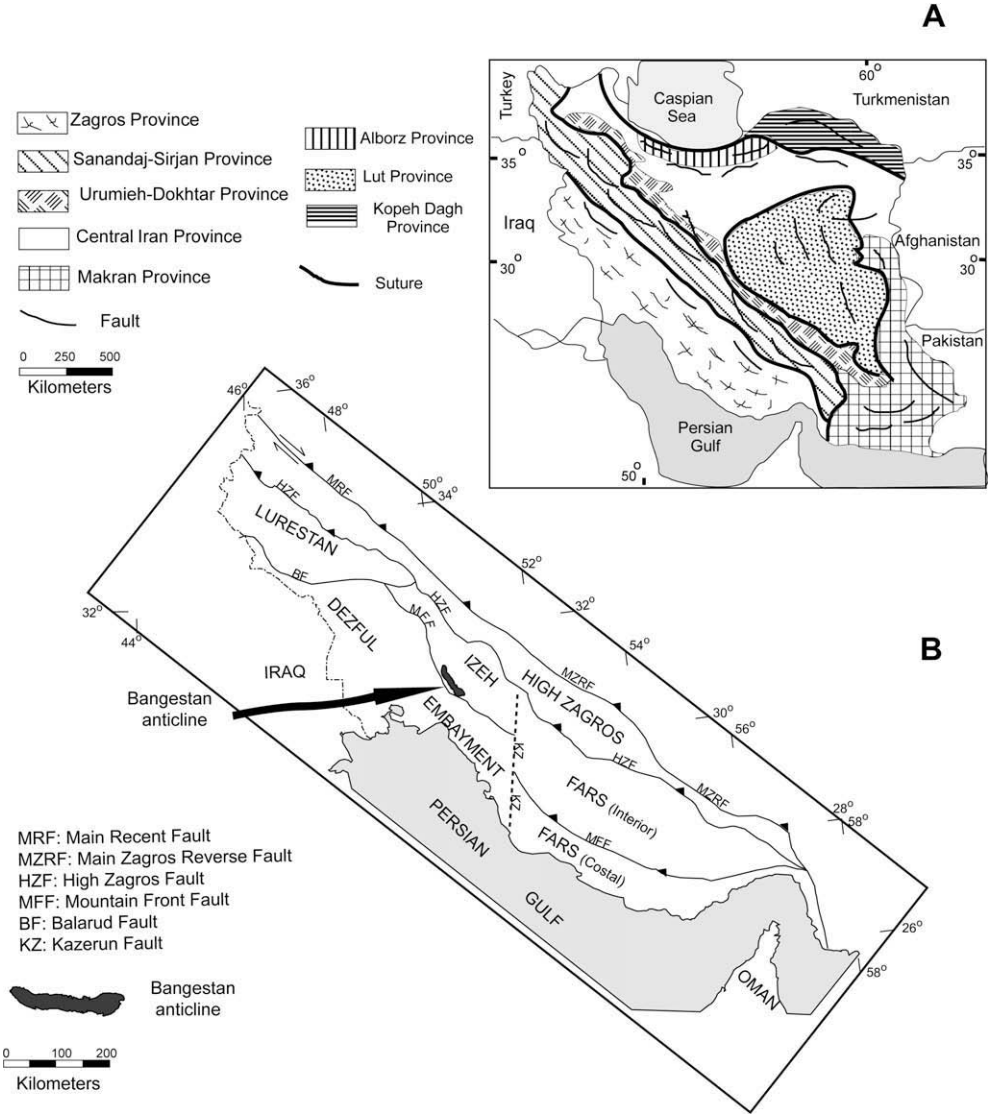

Fig. 2. Location of the study area. (A) General map of Iran showing eight geologic provinces. The Bangestan anticline is located in the Zagros (adapted from Heydari et al. (2003)). (B) Subdivisions of the Zagros province (adapted from Farzipour-Saein et al. (2009)).