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Microbiostratigraphy of the Gurpi Formation in the Farashband and Jam-Asaluyeh Sections, Southwest of Iran

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ABSTRACT

The present study examines microbiostratigraphy of the Gurpi Formation at Farashband and Jam-Asaluyeh sections. At both stratigraphic sections, the Pabdeh Formation with thin- bedded purple shales overlies the Gurpi Formation, while the Sarvak Formation with grey, thick-bedded limestone underlies the Gurpi Formation along an erosional unconformity. Microbiostratigraphic analysis led to identification of 19 genera and 33 species of planktonic Foraminifera, from which 8 biozones were identified. Age of the Gurpi Formation at Farashband and Jam-Asaluyeh sections was assigned to late Santonian to late Maastrichtian.

Keywords Biozone, Foraminifera, Plankton, SW Iran, Stratigraphy.

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INTRODUCTION

The Zagros zone is located Southwest of Iran and is considered a significant tectonic division with its own sub-divisions. The present study examines the Gurpi Formation at Farashband and Jam-Asaluyeh sections. Based on geological structure of Iran by Falcon (1969), Farashband section is located in Zagros fold-thrust belt in interior Fars area. The Fars area is bound from the West to Kazerun fault, from the East to the imaginary line separating Bandar Abbas Hinterland from Fars, from the North to thrusts and from

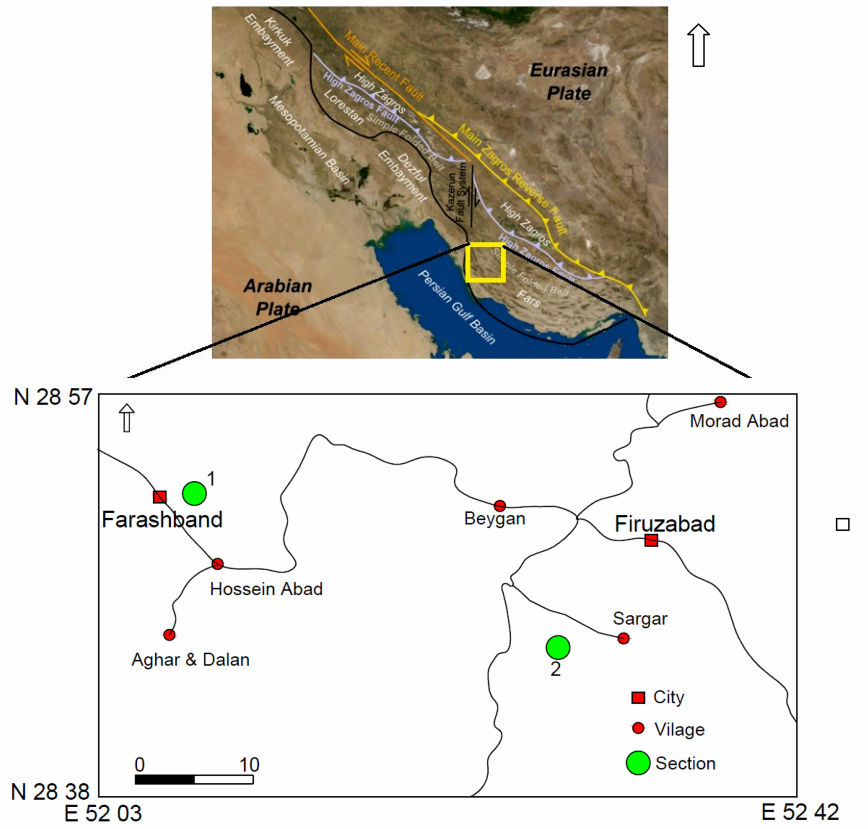

Fig. 1. Geographical position of sections; Section 1: Farashband, Section 2 : Jam-Asaluyeh (from Google Earth).

the South to Persian Gulf coast (Fig. 1). Stratigraphic Jam-Asaluyeh section is also located in folded Zagros zone in Bandar Abbas Hinterland area. Bandar Abbas Hinterland is bounded by Minab fault to the East, Zagros fold to the South and a lineament to the North.

Type section of the Gurpi Formation was taken from Tang-e Pabdeh at the Southeast edge of Gurpi Mountain, North of Lali oilfield. Row of the formation includes 320 m marl and bluish gray shales and thin-bedded argillaceous limestone. The Gurpi Formation at type section overlies the limestones of the llam Gurpi along an erosional unconformity. It features a weathered zone containing iron compounds. In the type section, the upper boundary of this formation is with the Pabdeh Formation and is based on purple sandy and silty shales that make up the base of the Pabdeh Formation. This boundary lies along an erosional unconformity in Fars and Khuzestan Provinces but is conformity in Lorestan Province. In Southern parts of Dezful and its immediate areas, the upper boundary of the Gurpi Formation is determined with a thin-bedded conglomerate and glauconitic layers underlying a phosphatic and cherty limestone.

Geographical position and accessibility

Farashband stratigraphic section is accessible from main route of Farashband-Firoozabad located North of Farashband city (Fig. 2). The grid coordinates for the base of section is $52^{0}07'05''$Eastern longitude and $28^{0}53'15''$ Northern latitude. Jam-Asaluyeh stratigraphic section is located 35 km Northeast of Jam and is accessible from Shiraz- Asaluyeh road (Fig. 3). The grid coordinates for the base of section is $52^{0}26'\ 03''$ Eastern longitude and $28^{0}\ 43'\ 12''$ Northern latitude.

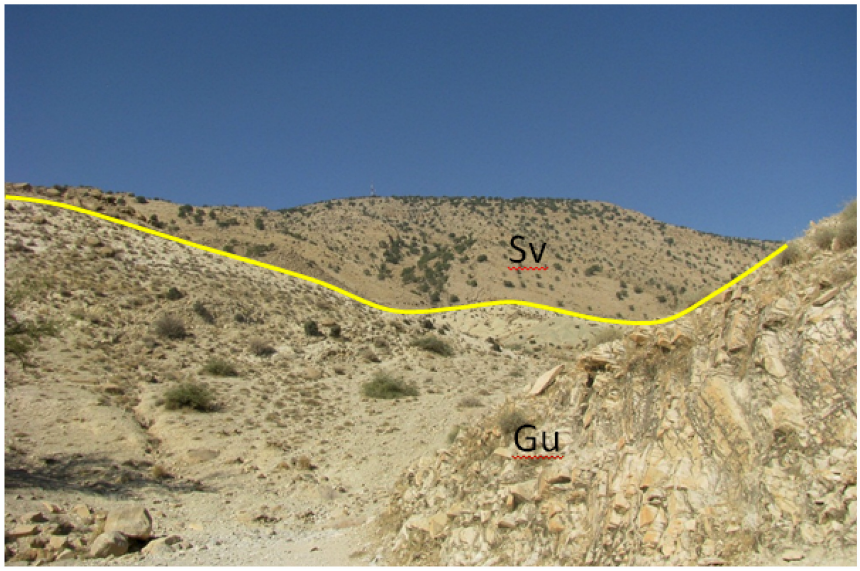

Fig. 2. Disconformity of the Gurpi and Sarvak Formations in the Farashand section, view to NE.

MATERIALS AND METHODS

The study is divided into three sections

Data collection : The study takes advantages of any related book, journal, essays, dissertations, maps, topographical and geological findings and satellite images.

Field trip : The target site was identified based on geological maps and Road Atlas of Iran and the zone was inspected to identify sampling points. Sampling was performed at certain distances considering petrographic changes and sedimentary layers to be studied under a microscope. Layer slope and length were determined using a GPS at certain geographical positions.

Laboratory study : Microscopic thin sections were first prepared to be studied by a polarizing microscope. All the microfossils were identified and photographed. Biostratigraphic distribution of

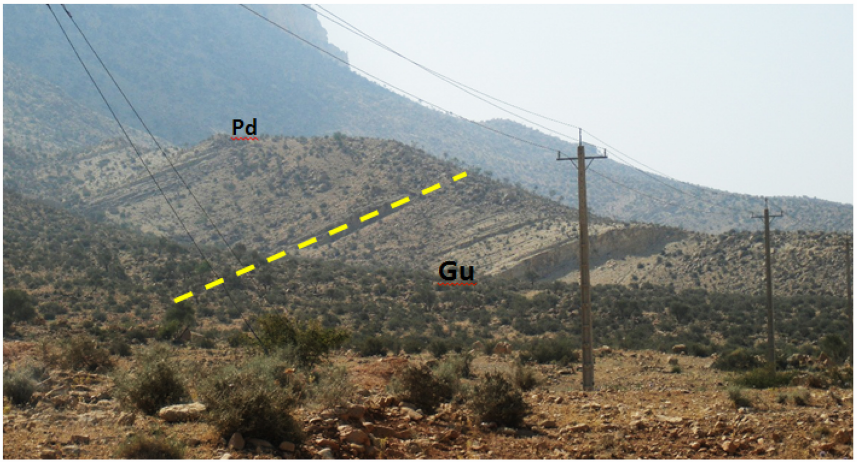

Fig. 3. Boundary of the Gurpi, Pabdeh and Sarvak Formations in the Jam-Asaluyeh section, view to SE.

microfossils was studied at stratigraphic column and biostratigraphic map was designed. Then, biozones were separated and their respective ages were determined from microfossils.

Lithostratigraphy of the Gurpi Formation in study sections

Farashband section

Farashband section is located in Zagros fold-thrust belt in interior Fars area and features the Gurpi, Sarvak and Pabdeh Formations. The Sarvak Formation with grey, thick-bedded limestone underlies the Gurpi Formation, while the Pabdeh Formation with thin-bedded purple shales overlies the Gurpi Formation. The Gurpi Formation in this section is 144 m thick and its bottom-up rock units include the following units: Grey, thin-bedded shale (37 m), Light-grey, thin-to medium-bedded shale (41 m), Cream, thin-bedded shaly limestone (13 m), Grey, thin-bedded shale (36 m), Light-grey, thin -to medium-bedded shale (16 m), Cream, thin-bedded shaly limestone (5 m).

Jam-Asaluyeh section

Jam-Asaluyeh section is located in folded Zagros zone in the Bandar Abbas Hinterland area and includes the Sarvak, Gurpi and Pabdeh Formations. The Sarvak Formation consists of grey, thick-bedded limestones that underlie the Gurpi Formation along a disconformity. The Pabdeh Formation with purple, thin-bedded shales overlies the Gurpi Formation along a paraconformity. The Gurpi Formation is 166 m thick in this section and includes the following rock units : Grey, thin -bedded shales (47 m), Light-grey, thin-to medium-bedded bedded shale (41 m), Cream, thin-bedded shaly limestone (20 m), Grey, thin-bedded shale (39 m), Light-grey, thin- to medium-bedded shale (19 m).

RESULTS

Microbiostratigraphy of the Gurpi Formation in the study sections

Microbiostratigraphic analysis of the Gurpi Formation in Farashband section led to identification of 15 genera and 24 species of planktonic Foraminifera include the following fauna that led to identification of seven biozones (Fig. 4), (Table 1) : *Dicarinella asymetrica, Dicarinella concavata, dicarinella* sp., *Globotruncana lapparenti, Globotruncana arca, Globotruncana bulloides, Globotruncana hilli, Globotruncana ventricosa, Globotruncana aegyptiaca, Globotruncana* sp., *Radotruncana calcarata, Globotruncanita conica, Globotruncanita elevata, Globotruncanella havanensis, Macroglobigerinelloides* sp., *Marginotruncana* sp., *Contusotruncana fornicata, Contusotruncana* sp., *Gansserina gansseri, Rugoglobigerina* sp., *Heterohelix* sp., *Lenticulina* sp., *Textularia* sp., *Gavelinella* sp.

At Jam-Asaluyeh section, 15 genera and 24 species of planktonic Foraminifera include the following fauna were identified that led to identification of five biozones (Figs. 5 and 6): *Dicarinella asymetrica, Dicarinella* sp., *Globotruncana arca, Globotruncana bulloides, Globotruncana falsostuarti, Globotruncana ventricosa, Globotruncana hilli, Globotruncana* sp., *Heterohelix pulchra, Heterohelix globolusa, Heterohelix* sp., *Contustruncana fornicata, Contusotruncana* sp., *Globotruncanita* cf. *elevata, Rugoglobigerina rogosa, Rugoglobigerina* sp., *Macroglobigerinelloides* sp., *Marginotruncana* sp., *Lenticulina* sp., *Textularia* sp., *Nodosria* sp., *Marsonella* sp., *Minouxia* sp., *Bolivina* sp. Identified biozones in the study sections are as follow :

Biozone 1 : *Dicarinella asymetrica*
Total range zone
Age : Late Santonian

It is a total range zone starting and ending with first and last appearance of *Dicarinella asymetrica*. Most important specimens of the biozone are *Dicarinella asymetrica, Dicarinella concavata, Dicarinella* sp., *Globotruncana lapparenti, Contusotruncana fornicata, Globotruncana arca, Globotruncana bulloides.* This biozone was identified as a Santonian biozone in the West and Central Tethys by Caron (1985) in the Atlantic by Premoli and Bolli (1973). Premoli and Verga (2004) identified this biozone as a early Santonian and early Campanian zone. However, as *Globotruncanita elevate* appears in early Campanian period and is observed at the base of the Gurpi Formation in the study areas, the age of Gurpi Formation is estimated as late Santonian. This biozone is identified in the both study sections. The thickness

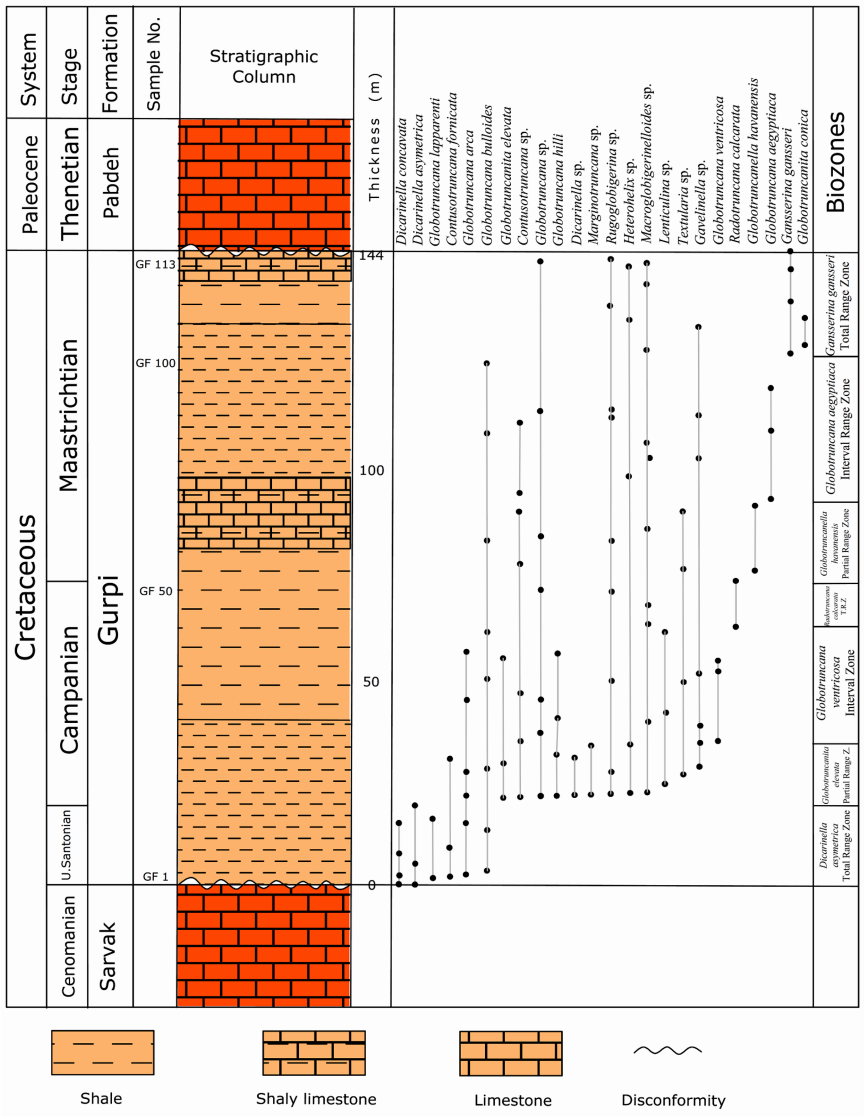

Fig. 4. Biostratigraphic column of the Gurpi Formation in the Farashband section.

of the biozone is 19 m and 25 m in the Farashband and Jam-Asaluyeh sections, respectively. Biozone 1 is observed in grey, thin-bedded shales at the base of the Gurpi Formation.

Biozone 2 : *Globotruncanita elevata*
Partial range zone
Age : Early Campanian

It is a partial range zone that starts with the extinction of *Dicarinella asymetrica* and first appearance of *Globotruncana ventricos*. This biozone has more fossil diversity and include the following Foraminifera : *Globotruncanita elevata, Contusotruncana fornicata, Globotruncana hilli, Globotruncana bulloides, Globotruncana arca, Contusotruncana* sp., *Globotruncana* sp., *Dicarinella* sp., *Marginotruncana* sp., *Rugoglobigerina* sp., *Heterohelix* sp., *Macroglobigerinelloides* sp., *Lenticulina* sp., *Textularia* sp., *Gavelinella* sp.

Table 1. A comparison of biozones in the study areas with identified biozones in other areas.

Stage	Wynd James (1965)	Caron (1985)	Sliter (1989)	Premoli Silva and Verga (2004)	This study		
M.Y	Zagros	Tethys	Tethys		Sarvastan	Farashband	Jan-Asaluyeh
65							
	Abathomphalus mayaroensis Zone	*Abathomphalus mayaroensis* Zone	*Abathomphalus mayaroensis* Zone	*Abathomphalus mayaroensis* Zone			
Maastrichtian		*Ganssreina gansseri*	*Ganssreina gansseri*		*Gansserina gansseri*	*Gansserina gansseri*	*Ganserina ganseri*
	Globotruncana stuarti	Zone	Zone	*Contusotruncana contusa,*	Zone	Zone	Zone
	Pseudotextularia varians	*Globotruncana aegyptiaca* Zone	*Globotrubcana aegyptiaca* Zone	*Racemigucmblina fructicosa* Zone	*Globotrunc-anita stuarti* Zone	*Globotruncana aegyptiaca* Zone	*Gldobotruncanita falsostuarti* Zone
	Zone	*Globotruncanella havanensis* Zone	*Globotruncanella havanenssis* Zone	*Ganssreina gansseri* Zone`		*Globotrunca-nella havanensis Zone*	
71.3				*Globotruncana aegyptiaca* Zone			
		Radotruncana calcarata Zone	*Radotruncana calcarata* Zone	*Globotruncanella havanensts* Zone *Radotruncana calcarata* Zone	*Radotruncana calcarata* Zone	*Radotrun-cana calcarata* Zone	*Radotruncana calcarata* Zone
	Globotruncana elevata & *elevata* Zone	*Globotruncana ventricosa* Zone	*Globotruncana ventricosa* Zone	*Globotruncana ventricosa* Zone	*Globotruncana ventricosa* Zone	*Globotruncana ventricosa* Zone	*Globotrun-cana ventricosa* Zone
Campanian							
		Globotruncanita elevata Zone	*Globotruncanita elevata* Zone	*Globotruncanita elevata* Zone	*Globotruncana elevata* Zone	*Globotruncana elevata* Zone	*Globotruncana elevata* Zone
83.5							
Santonian	*Globotruncana concavata carinata* Zone	*Dicarinella asymetrica* Zone	*Dicarinella asytmetrica* Zone	*Dicarinella asymetrica* Zone	*Dicarinella asymetrica* Zone	*Dicarinella asymetrica* Zone	*Dicarinella asymetrica* Zone
85.8							
Coniacian	*Globotruncana schneegansi* Zone	*Dicarinella concavata* Zone *Dicarinella primitive*	*Dicarinella concavata* Zone	Zone	*Dicarinella concavata* Zone		
82							

It is identified from West Caribbean, East and Central Tethys as early Campanian by Caron (1985), Premoli and Verga (2004). However, based on biozonation of Caron (1985), Premoli and Verga (2004), the age of this biozone is estimated to be early to middle Campanian. Biozone 2 was identified in the both study sections. Its thickness is 12 m and 21 m in the Farashband and Jam-Asaluyeh sections, respectively.

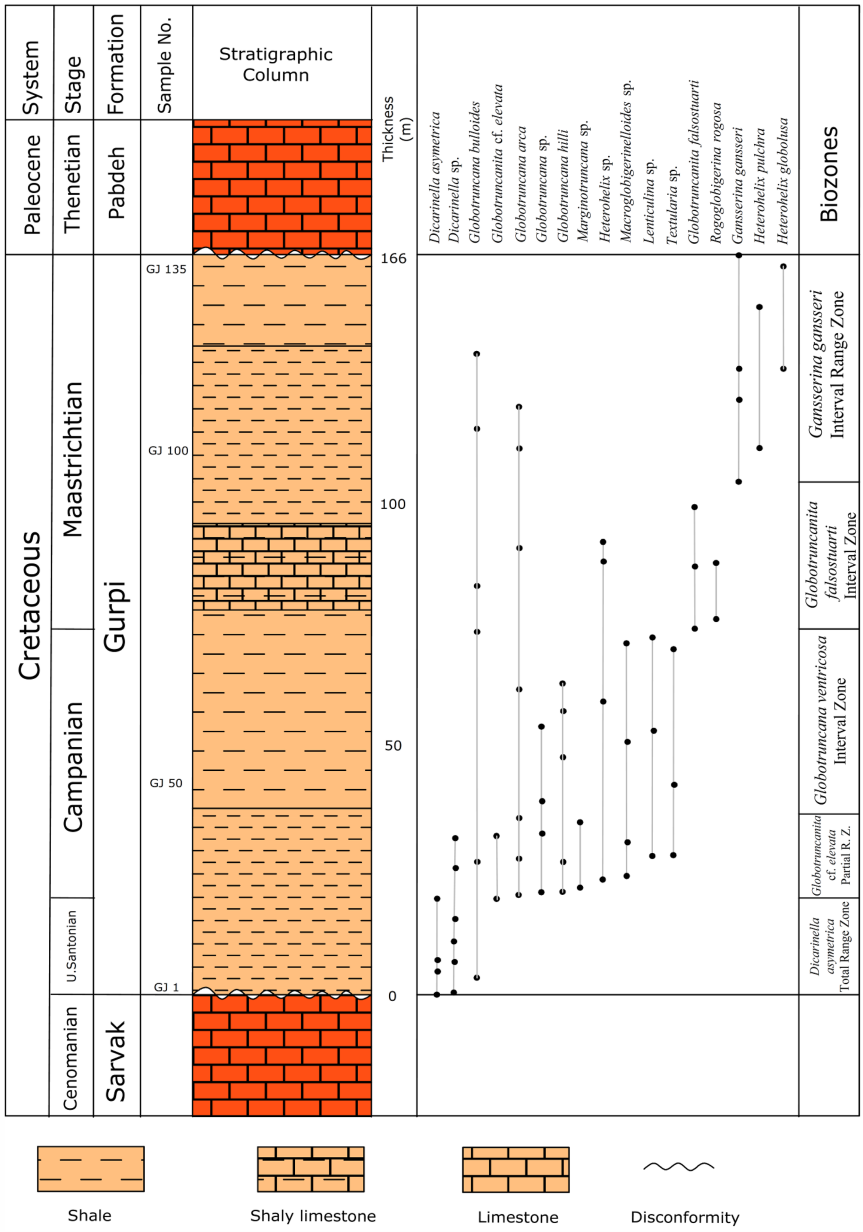

Fig. 5. Biostratigraphic column of the Gurpi Formation in the Jam-Asaluyeh section.

It is observed in grey, thin-bedded shales at the base of Gurpi Formation.

Biozone 3 : *Globotruncana ventricosa* Interval zone
Age : Middle to Early Late Campanian

It is an interval zone starting with the appearance of *Globotruncana ventricosa* and ending with the first appearance of *Radotruncana calcarata*. At Jam-Asaluyeh section, this biozone ends with first appearance of *Globotruncanita falsostuarti.* Identified specimens in this biozone include *Globotruncana ventricosa, Globotruncanita elevata, Globotruncana hilli, Globotruncana bulloides, Globotruncana arca,*

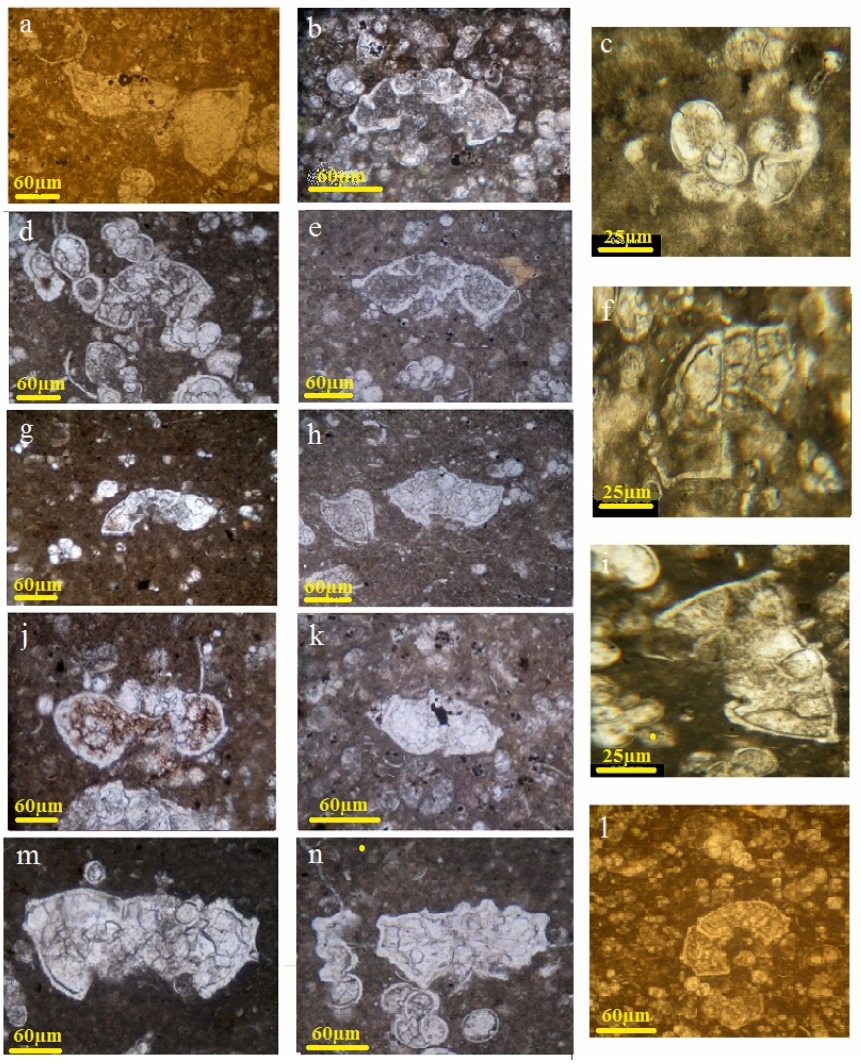

Fig. 6. a: *Dicarinella asymetrica* Sigal 1952, Axial Section, Asaluyeh Section, b: *Contusotruncana fornicata* Plummer 1931, Axial Section, Farashband Section, c: *Rugoglobigerina rugosa* Plummer 1926, Oblique Section, Asaluyeh Section, d: *Globotruncanita conica.* White 1928, Axial Section, Farashband Section, e: *Globotruncanita stuartiformis* Dalbiez 1955, Axial Section, Asaluyeh Section, f: *Globotruncanita elevate* Brotzen 1934, Sub-Axial Section, Asaluyeh Section, g: *Globotruncanella havanensis* Voorwjik 1937, Axial Section, Farashband Section, h: *Globotruncana falsostuarti* Sigal 1952, Axial Section, Asaluyeh Section. i: *Gansserina* cf. *gansseri* Bolli 1951, Sub-Axial Section, Farashband Section, j: *Globotruncana hilli* Pessagno 1967, Axial Section, Farashband Section, k: *Globotruncana lapparenti* Brotzen 1936, Sub-Axial Section, Farashband Section, l: *Globotruncana arca* Cushman 1926, Sub-Axial Section, Asaluyeh Section, m: *Globotruncana aegyptiaca* Nakkady 1950, Sub-Axial Section, Farashband section, n: *Globotruncana ventricosa* white 1928, Sub-Axial Section, Farashband Section.

Contusotruncana sp.*, Globotruncana* sp.*, Macroglobigerinelloides* sp., *Rugoglobigerina* sp., *Lenticulina* sp., *Textularia* sp., *Gavelinella* sp., *Nodosria* sp., *Marsonella* sp., *Minouxia* sp. and *Bolivina* sp. It is reported by Caron (1985), Premoli and Verga (2004) as middle to late Campanian. Based on biozonation of Caron (1985), Premoli and Verga (2004), the age of this biozone is estimated as late Campanian. This biozone is identified in the both study sections. Its thickness is 27 m and 37 m in the Farashband and

Jam-Asaluyeh sections, respectively. It is observed in light-grey, thin-to medium-bedded shales.

Biozone 4: *Radotruncana calcarata*
Total range zone
Age : Late Campanian

It is a total range zone with a lower and upper boundary of appearance and extinction of *Radotruncana calcarata*. Identified specimens in this biozone include *Radotruncana calcarata, Globotruncana bulloides, Globotruncana* sp., *Macroglobigerinelloides* sp., *Rugoglobigerina* sp. and *Textularia* sp. It is reported by Premoli and Bolli (1973) in the Atlantic and by Caron (1985), Premoli and Verga (2004) in Western and Central Tethys with late Campanian age. Its thickness is 9 m and lies over grey, medium-to thin bedded shales. Its age is estimated as late Campanian based on biozonation of Caron (1985) and Premoli and Verga (2004).

Biozone 5 : *Globotruncanella havanensis*
Partial range zone
Age : Early Maastrichtian

It is a partial range zone starting with extinction of *Radotruncana calcarata* and ending with appearance of *Globotruncana aegyptiaca.* Indentified specimens in this biozone include *Globotruncanella havanensis, Globotruncana bulloides, Globotruncana* sp., *Macroglobigerinelloides* sp., *Rugoglobigerina* sp. and *Textularia* sp. It was identified by Premoli and Verga (2004) with late Campanian age and by Caron (1985) with Maastrichtian age. Its age is considered early Maastrichtian based on biozonation of Caron (1985). It is 19 m thick and only is observed in the Farashband section, in medium to thin-bedded gray shales (lower part of biozone 5) and its upper part is in cream, thin-bedded shaly limestone.

Biozone 6 : *Globotruncana aegyptiaca*
Interval range zone
Age : Early Maastrichtian

It is an interval zone starting with the appearance of *Globotruncana aegytiaca* and ending with the appearance of *Gansserina gansseri.* Identified specimens in this biozone include *Globotruncana aegyptiaca, Globotruncana bulloides, Globotruncana* sp., *Rugoglobigerina* sp., *Macroglobigerinelloides* sp., *Contusotruncana* sp., *Heterohelix* sp. and *Gavelinella* sp. It is reported to be late Campanian by Premoli and Verga (2004) and early Maastrichtian by Caron (1985). Based on biozonation of Caron (1985), the age of this biozone is early Maastrichtian. It is 31 m thick and is only found in the Farashband section. Beginning biozone is in cream, thin-bedded shaly limestone but its main part in grey, thin-bedded shales.

Biozone 7 : *Globotruncanita falsostuarti* Interval zone
Age : Early Maastrichtian

It is an interval zone starting with the appearance of *Globotruncanita falsostuarti* and ending with *Gansserina gansseri*. At Jam-Asaluyeh section, *Globotruncana aegyptiaca* is not observed and its upper boundary is determined with appearance of *Gansserina gansseri*. Because of lack of *Globotruncanella havanensis* and *Globotruncana aegyptiaca*, this biozone is equal two biozones at Farashband section and other areas of Zagros. Some identified microfossils are *Heterohelix* sp., *Globotruncana arca, Globotruncana falsostuarti, Globotruncana bulloides, Ragoglobigerina rogosa* and *Globotruncanita falsostuarti* signifies the age of this biozone as early Maastrichtian. This biozone is only observed in the Jam-Asaluyeh section. It is 34 m thick and can be seen in medium-bedded shay limestones.

Biozone 8 : *Gansserina gansseri* Total range zone
Age : Late Maastrichtian

It is an interval zone starting with *Gansserina gansseri* and ending with *Abatomphalus mayaorensis.* However, in the studies sections *Abatomphalus mayaorensis* was not observed. Thus, this is a total range zone starting and ending with the extinction of *Gansserina gansseri*. Identified specimens in this biozone include *Gansserina gansseri, Globotruncanita conica, Globotruncana arca, Globotruncana bulloides, Globotruncana* sp., *Macroglobigerinelloides* sp., *Contustruncana fornicata, Contusotruncana* sp., *Rugoglobigerina* sp., *Heterohelix pulchra, Heterohelix* sp., *Heterohelix globolusa* and *Gavelinella* sp.

It is reported by Premoli and Verga (2004) with

late Campanian to Maastrichtian age and by Caron (1985) with early Maastrichtian to late Maastrichtian age in Tethys. It is also identified in Tethys. Based on biozonation of Caron (1985), the age of this biozone is late Maastrichtian. It is identified in the both study sections. It is 27 m and 48 m thick in the Farashband and Jam-Asaluyeh sections, respectively. Lower part of this biozone is located in light-grey, thin-to medium-bedded shales and its upper part can be seen in cream, thin-bedded shaly limestone.

DISCUSSION

A total number of eight biozones are identified based on planktonic Foraminifera in the study sections. The first biozone is a *Dicarinella asymetrica* total range zone identified in the both sections and indicated the age of late Santonian. It is also identified in other sections of Zagros such as Muk section in Fars (Esmaeilbeyk and Khosrotehrani 2009), Kuh Khanehkat section in East of Shiraz (Esmaeilbeyk 2012), Kuh Sefid Ramhormoz section in Khuzestan and Kuh Siahdasht (Fereidoonpour et al. 2014) and in Lorestan at anticline of Khorramabad (Maghfori 2015). The second biozone is a *Globotruncanita elevata* partial range zone aged early Campanian that is identified in the both sections. It is commonly identified in other areas of Zagros : In Fars at Sarvestan section, Kuh Kordelar Section, Kuh Chel Cheshmeh Khorameh (Etemad 2007), Asaluyeh section (Daneshian et al. 2009), Muk section in South of Shiraz (Esmaeilbeyk and Khosrotehrani 2009), West Firoozabad (Abrari et al. 2011), in Khuzestan at Nemuneh section (Kameliazan 2004), Kuh Sefid Ramhormoz section and Kuh Siahdasht (Fereidoonpour et al. 2014) and in Lorestan at Banroshan section in Southwest of Ilam (Bakhshandeh et al. 2015), anticle of Khorramabad (Maghfori 2015) and Mish Khas in Southeast of Ilam (Asgharian 2012).

The third biozone is a *Globotruncana ventricosa* interval zone aged middle to late Campanian. It is identified in the both sections and was widely reported to be identified in other areas of Zagros: In Fars at Sarvestan section, Kuh Kordelar Section, Kuh Gachlar (Etemad 2007), Chehl Cheshmeh Khorameh (Etemad 2007), Asaluyeh section (Daneshian et al. 2009), Muk section in South of Shiraz (Esmaeilbeyk and Khosrotehrani 2009), West Firoozabad (Abrari et al. 2011), Kuh Khanehkat section in East of Shiraz (Esmaeilbeyk 2012) in Khuzestan at Nemuneh section (Kameliazan 2004), Kuh Sefid Ramhormoz section and Kuh Siahdasht (Fereidoonpour et al. 2014) and in Lorestan at Banroshan section in Southwest of Ilam (Bakhshandeh et al. 2015), anticline of Khorramabad (Maghfori 2015). The fourth biozone is a *Radotruncana calcarata* total range zone aged late Campanian and is only observed at Farashband section. It is not widely spread in Zagros and is identified in Fars at West Firoozabad (Abrari et al. 2011), in Khuzestan at Nemuneh section (Kameliazan 2004), Kuh Sefid Ramhormoz section and Khu Siahdasht (Fereidoonpour et al. 2014) and in Lorestan at Southeast of Ilam (Bakhshandeh et al. 2015), anticline of Khorramabad (Maghfori 2015).

The fifth biozone is a *Globotruncanella havanensis* patial range zone aged early Maastrichtian that is identified in the Farahsband section. It is identified in other sections including West Firoozabad in Fars (Abrari et al. 2011), in Khuzestan at Kohsefid Ramhormoz section and Kuh Siahdasht (Fereidoonpour et al. 2014) and in Lorestan at Banroshan section in Southwest of Ilam (Bakhshandeh et al. 2015). The sixth biozone is a *Globotruncana aegyptiaca* interval range zone aged early Maastrichtian that is identified in the Farahsband section. It is identified in other sections including West Firoozabad in Fars (Abrari et al. 2011), in Khuzestan at Kohsefid Ramhormoz section and Kuh Siahdasht (Fereidoonpour et al. 2014) and in Lorestan at Banroshan section in Southwest of Ilam (Bakhshandeh et al. 2015), Southeast of Ilam (Bakhshandeh et al. 2015) and anticline of Khorramabad (Maghfori 2015).

The seventh biozone is a *Globotruncanita falsostuarti* interval zone aged early Maastrichtian that is identified in the Jam-Asaluyeh section. It was identified at Muk section in Fars (Esmaeilbeyk and Khosrotehrani 2009), Asaluyeh and Chah Ivan (Daneshian et al. 2009). The eighth biozone is a *Gansserina gansseri* total range zone aged late Maastrichtian that is identified in the both sections. It was also identified in Fars at Sarvestan section, Kuh Kordelar section, Chehl Cheshmeh Khorameh (Etemad 2007), Asaluyeh and Chah Ivan (Daneshian

et al. 2009), West Eiroozabad (Abrari et al. 2011), in Khuzestan at Nemuneh section (Kameliazan 2004), Kuh Sefid Ramhormoz section and Kuh Siahdasht (Fereidoonpour et al. 2014), and in Lorestan in Southeast of Ilam (Bakhshandeh et al. 2015), anticline of Khorramabad (Maghfori 2015).

Based on these biozones, the age of the Gurpi Formation in the Farashband and Jam-Asaluyeh sections was identified as late Santonian and late Maastrichtian. However, its age at other areas of Zagros is identified differently by other researchers. It is estimated at Sarvestan Section as early Campanian-middle Maastrichtian, Kuh Kordelar section as middle Campanian to middle Maastrichtian, Asaluyeh section (Daneshian et al. 2009) as Campanian-Maastrichtian, Chah Ivan (Daneshian et al. 2009) as Maastrichtian, at Muk section South of Shiraz (Esmaeilbeyk and Khosrotehrani 2009) as early Santonian-late Maastrichtian. Bakhtar Firoozabad (Abrari et al. 2011) as late Santonian-middle Maastrichtian, Kuh Khanehkat section in East of Shiraz (Esmaeilbeyk 2012) as early Santonian-late Maastrichtian. In Khuzestan Province, it is estimated in Nemuneh section (Kameliazan 2004) as early Campanian-late Maastrichtian, in Kuh Siahdasht (Fereidoonpour et al. 2014) as early Santonian-early Maastrichtian, Kuh Sefid Ramhormoz section as late Campanian-late Maastrichtian. In Lorestan Province its age is estimated in anticline of Khorramabad (Maghfori 2015) as late Santonian-early Maastrichtian, at Banroshan section in Southwest of Ilam (Bakhshandeh et al. 2015) as early Santonian- Paleocene and in Mish Khas in Southeast of Ilam (Asgharian 2012) as early Santonian-late Paleocene.

CONCLUSION

The present study examined microbiostratigraphy of the Gurpi Formation in Farashband and Jam-Asaluyeh sections. The Sarvek Formation consist of grey, thick -bedded limestone underlies the Gurpi Formation along a disconformity.The Pabdeh Formation consist of purple, than-bedded shales overlies the Gurpi Formation along a disconformity. Thickness of the Gurpi Formation in Farashband and Jam-Asaluyeh sections is 144 m and 166 m, respectively. Our analysis led to identification of 19 genera and 33 species of planktonic Foraminifera and 8 biozones that indicate a late Santonian-late Maastrichtian age for the formation in the study sections.

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