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Mineralogical Maturity, Weathering Index, Climate and Tectonic Setting of Injana Formation Based on Petrographic Constituents of Sandstones in Komal Syncline–North Iraq

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ABSTRACT

Petrographical study of Injana Formation showed that the sandstones are composed of quartz, feldspars, high proportion of rock fragments, other components and carbonate cement. The sandstones are textuarly, mineralogically immature as lithic arenite.

Petrographic criteria point out that a semiarid–semihumid climate had prevailed during deposition. The affinity to source area validate a back–arc tectonic environment for the source rocks, which was a sequel of the regional continental collision between the Arabian plate (Iraq) and Turkish, Iranian plate; with concomitant uplift and consequent increase in the erosional and depositional rates.

() (Komal syncline)
 (Dunnington, 1958) (Folded zone)

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 .() (Al-Naqib, 1980) ()

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(Transporting history)

(Paleoclimate)

(Tectonic setting)

.(Sing et al., 1993)

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(Point counter)

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(Polycrystalline quartz) (Chayes, 1949) (Monocrystalline quartz)

.() (Thoreau, 1982)

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Mineralogy	Range %	Average %
Monocrystalline quartz	9.6-15.7	12.6
Polycrystalline quartz	3.2-8.4	5.8
Total quartz	3.2-15.7	9.5
K-feldspar	7.2-18.1	12.5
Plagioclase	1.6-3.6	2.4
Total feldspar	1.6-18.1	7.4
Igneous, metamorphic and clastic sedimentary rock fragments	3.8-8.6	5.5
Micrite	17.1-33.9	24.3
Chert	2.1-5.9	3.9
Total rock fragments	2.1-33.9	11.2
Cement	8.8-22.1	16.0
Other components (serpentine, iron oxides, opaque minerals, mica and heavy minerals)	0.0-15.4	1.8
Mineralogical Maturity Index (MMI)	28.3-53.1	38.6

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.(Perthite texture) ()

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(Dott, 1964: In Pettijohn 1975)

(Al – Naqib, 1980) (lithic arenite).

(Serpentine)

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(%– 17.1)

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(Folk, 1974) (Post – orogeny)

.(Dunnington, 1958)

(McBride and Picard, 1987)

(Al-Juboury, 1994)

(Thrust zone)

(Mesozoic)

Mineralogical maturity

: (McBride and Picard, 1987)

$$\text{Mineralogical Maturity Index (MMI)} = \frac{\text{quartz + chert}}{\text{other grains}} \times 100$$

.() (% .) (% . - .)

(McBride et al, 1996)

(Textural criteria)

(composition)

(Al-Juboury, 1994)

Paleoclimate and terrian

.(Basu, 1985)

(Basu, 1976)

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(Cavazza et al., 1993)

(% .)

(Suttner and Dutta, 1986)
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(Grantham and Velbel, 1988)

(McBride et al., 1996)

(Suttner and Dutta, 1986)

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(Suttner and Dutta, 1986)

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(Weathering index) (wi)

(wi = 0)

(Eynatten and Gaupp, 1999)

(a)

(Eynatten and Gaupp, 1999)

(b)

(r = 0)

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(a) (plutonic)

.(Eynatten and Gaupp, 1999)

.(Johnson et al., 1988)

-a :

.(Eynatten and Gaupp, 1999)

-b

(Al-Juboury, 2001)

Tectonic setting

(Dickinson, 1985)

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(Suttner, 1974, Franzienlli and Potter, 1983)

.(Basu, 1976, 1985)

(Davies and Ethridge, 1975)

(Dickinson, 1985)

.() (Transitional Arc)

(Back-Arc)

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(Asideu et al., 2000)

(Numan, 1997)

(Critelli and Igersol, 1994)

) (Active)

() (Passive)

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(Dickinson, 1985)

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.(Numan, 1997)

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