



Climatic control of arenites: an example from the Carnian (Upper Triassic) of the Dolomites (northern Italy)

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Sedimentology and arenite composition have been investigated in the Upper Triassic of the Dolomites (Southern Alps, northern Italy). The siliciclastics of two superimposed mixed terrigenous-carbonate, Carnian formations have been studied. The transitional to shallow-marine Heiligkreuz Formation of the Dolomites records at least 8 high-frequency sedimentary cycles. The siliciclastic portions of each cycle are deposited in a shallow-water subtidal setting, always including high-density flow deposits in the lower part. Composition of arenites displays a short-term trend from lithic to quartzose. Mixed, high frequency cycles can be recognized also within the continental to transitional Travenanzes Formation. Arenites deposits are found in sporadic, channelized bodies, and in their related overbank sheets, representing flooding events of ephemeral streams. Fluctuations in the composition of arenites can still be recognized, with a strong quartz enrichment in the upper part of each cycle.

Siliciclastic constituents (quartz, feldspars and lithics of volcanoclastic origin) remain constant through time. Volcanoclastic grains may be either substantially unaltered or strongly altered, with altered volcanoclastic grains prevailing in the more quartzose facies. An upwards increase in quartz content is observed also through the whole succession. An influence of tectonics and/or source area changes on the compositional variations of arenites can be excluded.

The observed sedimentological and petrological changes are thus tentatively attributed to climatic forcing. We suggest that under wet seasonal climate soil erosion rates exceed the alteration rate, causing greater solid transport that delivers also unaltered grains. Under semiarid or arid climate, soil erosion results slower and works on pre-

viously weathered rocks, solid transport decreases and grains delivered are mostly altered lithics and quartz. In this framework, the lithic arenites of the Heiligkreuz Formation record the wetter climate, well fitting with the humid climatic shift recognized across the Tethyan domain (Carnian Pluvial Event of Simms and Ruffell, 1989), while the Travenanzes Formation records the re-establishment of arid to semi-arid conditions. Within each formation, the short-term sedimentary cycles may record high-frequency climate fluctuations (Kutzbach, 1994). This picture needs confirmation by further investigations, e.g. of paleosols, abundant within the Heiligkreuz and Travenanzes Formations, and by comparison to other coeval basins.

REFERENCES:

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