



Phosphogenesis and silicification associated to condensation events: an example from the Hauterivian – Barremian transition along the northern Tethyan margin (Helvetic realm, Switzerland)

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The Helvetic fold- and thrust belt is situated in the northern part of the central European Alps and includes a sedimentary succession which documents the evolution of the northern Tethyan margin during the Mesozoic and early Tertiary. The lower Cretaceous comprised in this tectonic zone is composed of an alternation of photozoan and heterozoan platform carbonates and highly condensed phosphatized, glauconitic and siliceous sediments. These latter sediments are associated with repetitive drowning episodes, which interfered with the growth of the northern Tethyan carbonate platform. These episodes are dated as early Valanginian to early Hauterivian, late early to early late Hauterivian, latest Hauterivian to latest early Barremian, late early Aptian to early late Aptian and latest Aptian to early Albian.

During the Hauterivian – Barremian drowning episode, phosphogenesis is documented in the form of macroscopic, highly condensed accumulations of phosphatized sediments and organisms. Glauconite is present in particulate form and may also form mineral envelopes in hardgrounds. Siliceous materials are either preserved in the form of the remains of siliceous organisms or diagenetic cements. Preferential authigenesis during platform drowning are interlinked processes and both related to the presence of a powerful east-west directed current system which upwelled onto the outer platform realm and induced erosion, sediment winnowing, and condensation. Furthermore, this current may have been an instrument of focused transfer of phosphate-enriched, colder, and eventually also CO₂-enriched deeper waters into the shelf realm, which were implied in platform drowning.