Tectonic, eustatic and climatic control on the Dachstein platform development in the Transdanubian Range, Hungary

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Transdanubian Range U
a part of ALCAPA
Upper Austroalpine
structural setting
was not affected by
intense Alpine deformations

The facies relations
reflect the original
paleogeographic
setting

Good potential
for analysis of
the facies development
Paleogeographical setting

It was located between the Upper Austroalpine and South Alpine domain.
The main stages of the structure evolution during the Alpine plate-tectonic cycle prior to the onset of the Dachstein platform development

- **Earliest Triassic** transgression
- **Early Triassic** mixed ramp

- **Early Anisian** carbonate ramp
- **Middle to Late Anisian** rifting: platforms and basins

- **Early Late Carnian** basin upfilling with fine terrigenous sediments
The final stage of the basin upfiling, and onset of the Dachstein platform evolution in the latest Carnian.
Anatomy of the **Dachstein Platform** in the TR and the main evolutionary stages
General facies pattern

inner platform – tidal flat: Lofer-cyclicility

outer platform: oncoidal facies with patch reefs

High-frequency cycles -- sequences

composite Fischer plot
1. Latest Carnian to mid-Norian – Hauptdolomit stage

- levelled topography
- platform aggradation
- oncoidal packstone with patch reefs in the outer platform
- wide belt of optimal tidal flat dolomitization
- semi-arid climate - dolocretes

characteristic Lofer-cycles

Vértes Mts.
2. **mid-Norian** Hauptdolomit - Dachstein Limestone transition stage

- Reduction of the width of the optimal tidal flat dolomitization zone;
- Wide belt of selective and partial dolomitization;
- Dolocretes, calcretes, and clayey reworked paleosol beds with black pebbles;
- More humid climate

**Dachstein Platform**

- Lagoonal - tidal flat dolomitization

**Gerecse Mts**

**Subtidal**

**Calcrete**
3. Mid-Norian

the lower Dachstein Limestone stage

Core Po-89
Bakony

- non-dolomitized successions in the NE and central parts
- reworked clayey paleosol beds
- well developed peritidal members
- tidal flat and shallow lagoon dolomites in the SW part

symmetric cycles are common
4. Late Norian onset of the Kössen Basin development

- incipient continental rifting of the Penninic Ocean led to development of a large extensional basin
- formation of basinal dolomites
- isolation of the Dachstein Platform
5a. Rhaetian the main stage of the Kössen Basin evolution...

- fine siliciclastic input from the continent suggesting humid climatic conditions
- carbonate input from the platform
5b. Rhaetian ...and the upper Dachstein Limestone stage

-continuation of the platform conditions on the isolated platform
-significant platform progradation onto the Kössen Basin in the late Rhaetian

truncated cycles, the peritidal members are usually thin
6a. earliest Jurassic
survival of the Dachstein Platform in the SW part of the TR

-prolongation of the platform growing shallow subtidal oncoidal limestones
-the peritidal beds and signals of the subaerial exposure are missing

Vörös & Galácz, 1998
6b. Triassic/Jurassic boundary
drowning of the Dachstein Platform in the NE part of the TR

Tata, Gerecse Mts

Early Hettangian gap
6c. Late Triassic – earliest Jurassic
prolongation of the basin conditions in the Csővár Basin

cherty limestones
carbonate turbidites
radiolarian pelagites
The main controlling factors

Geodynamic – tectonic
- development of extensional basins at the Neotethys margin since the Late Carnian
- development of the Kössen Basin at the Penninic margin during the latest Norian-Rhaetian

Climatic
- determination of the width of the zone of optimal dolomitization in the internal palatform – decreasing aridity
- siliciclastic event in the Kössen Basin in the Rhaetian -- humid episode

Eustatic
- high-frequency sea-level oscillation reflects in the Lofer-cyclicity
- higher order sea-level changes: transgression in the latest Carnian sea-level drop in the latest Norian transgression since the Rhaetian