

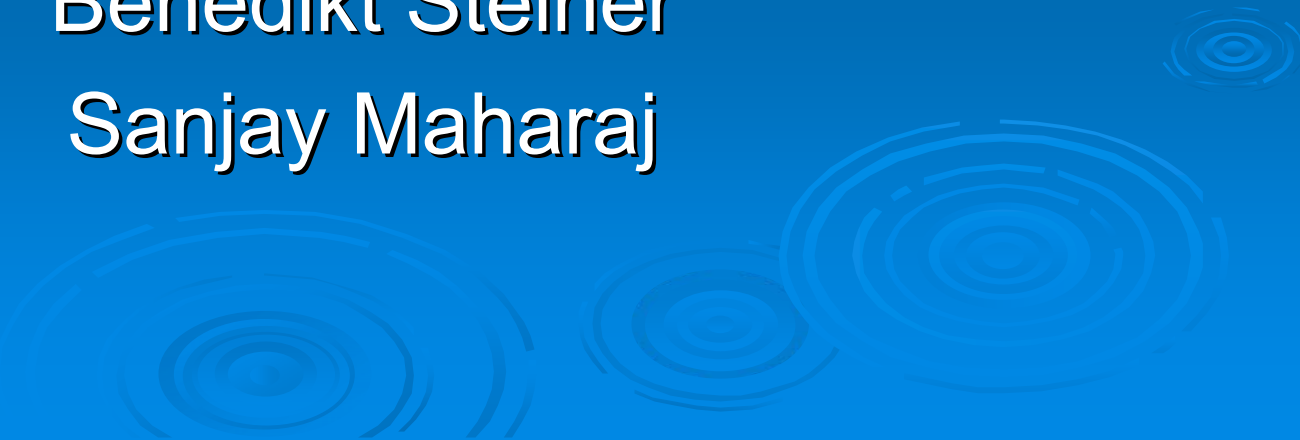
Fluvial Systems through time and space

Lower Triassic, South German Basin

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Outline

- Introduction
- Geological Setting
- Analysis of sedimentary sequences
- Facies analysis, Sequence stratigraphy

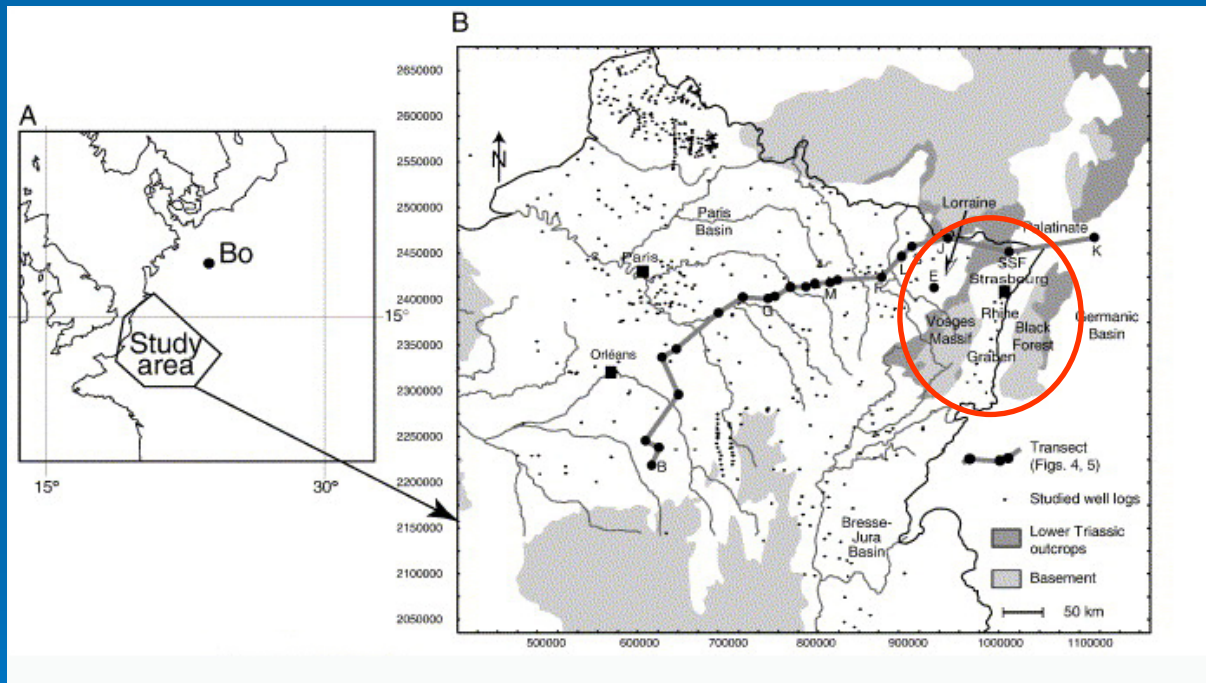
Introduction

- **Aim:** Analysis of the evolution of fluvial systems of the Lower Triassic through time and space
- **Location:** western part South German Basin
- How do climate and geodynamics influence the preservation of fluvial deposits?
- Construction of paleoenvironmental maps
- Sequence stratigraphy

Key References

- Bourquin et al. (2006)

Geographical Setting

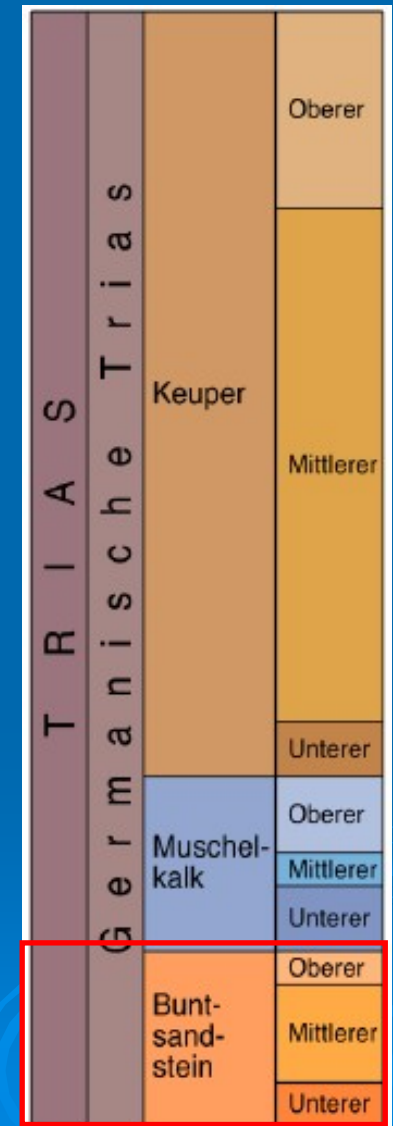


Bourquin et al. (2006)

Stratigraphy

➤ South German Triassic:

- Keuper (Upper Triassic)
- Muschelkalk (middle Triassic)
- Buntsandstein (lower Triassic)



Source:
stratigraphie.de

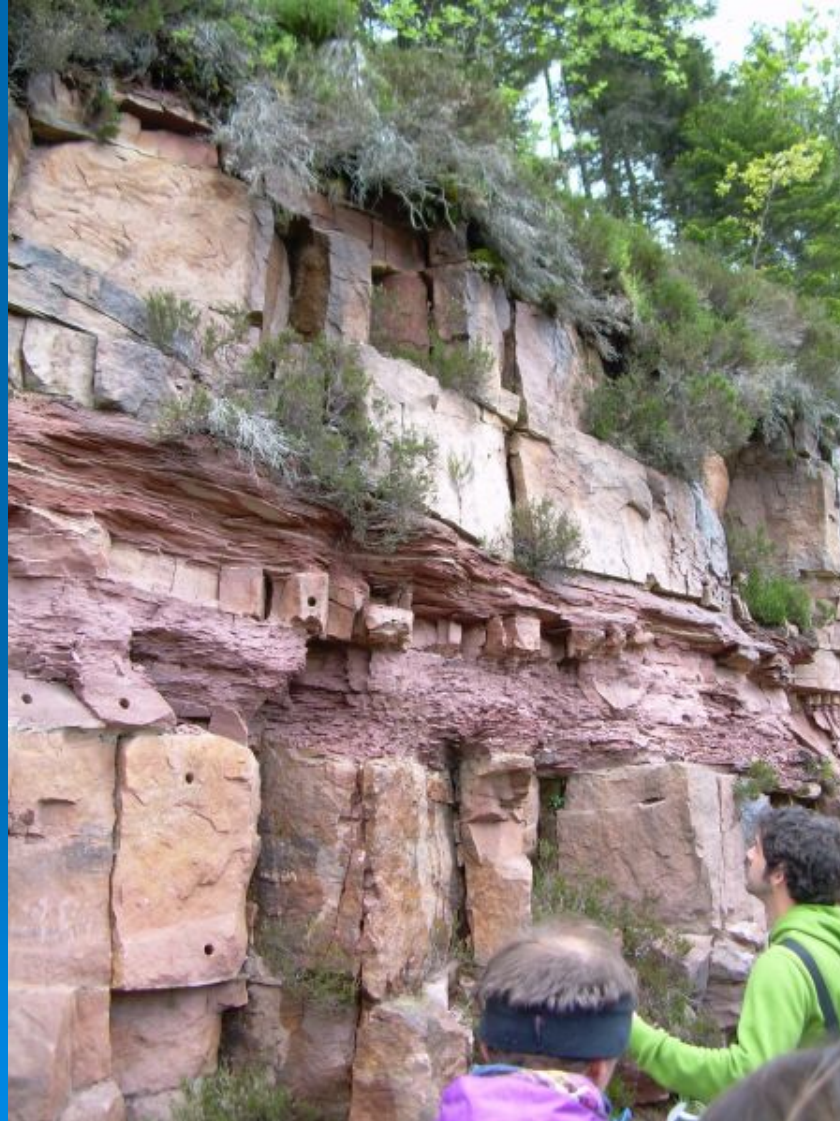
The Buntsandstein

The entire group is characterized by fluvial systems and sedimentation

| | | |
|-------------------------|--------|-------------|
| Dolomie limite | Letten | MUSCHELKALK |
| Dolomitic shales | -kohle | |
| Cacaïres à Térébratules | Upper | |
| Calcaires à céralites | | |
| calcaires à entroques | Upper | |
| Couches blanches | | |
| Couches grises | Middle | |
| Couches rouges | | |
| Complexe de Volmunster | Low | |
| Grès à Voltzia | Upper | |
| Couches intermédiaires | | |
| Zone limite violette | | |
| Conglomérat principal | Middle | |
| Grès vosgiens | | |
| Conglomérat basal | Lower | |

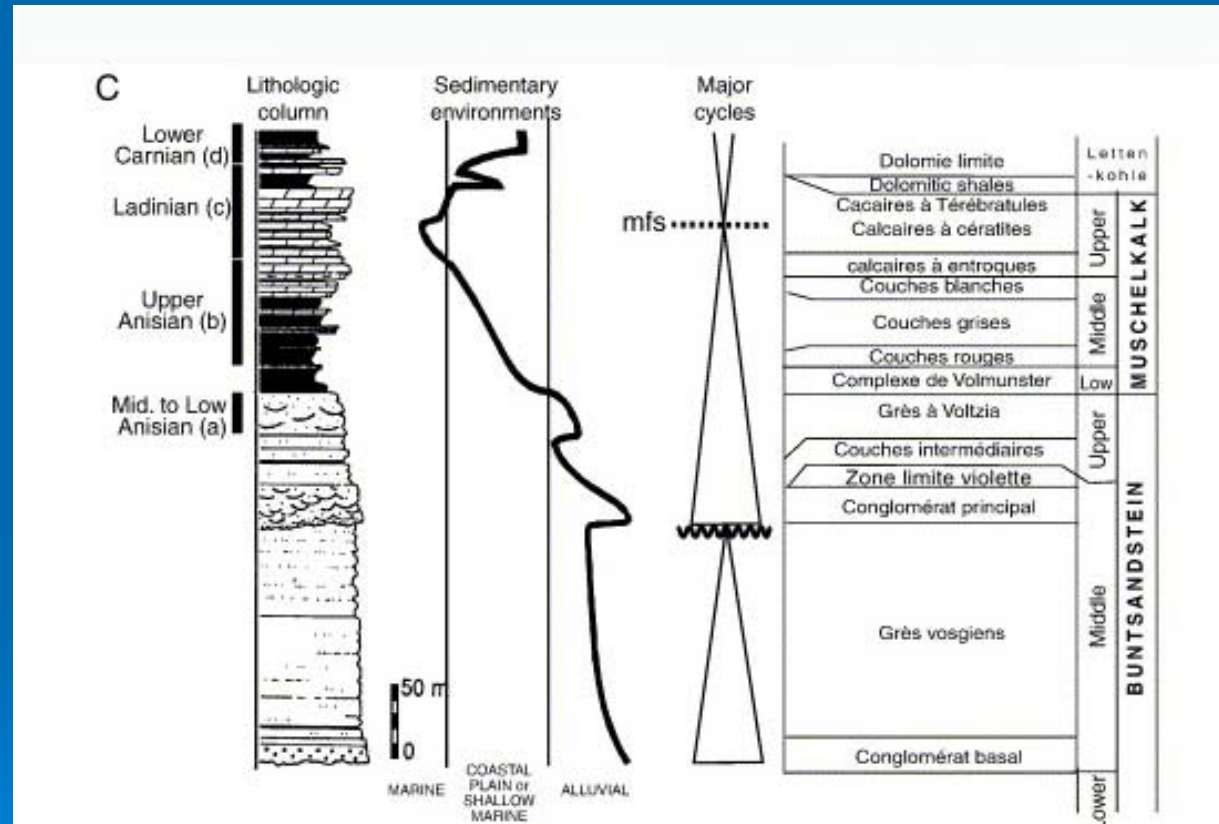
Bourquin et al. (2006)

The Buntsandstein



The Buntsandstein

- arid depositional environment
- sparse fauna
- Paleosols
- Lower/ Middle: braided rivers
- Upper: low sinuosity rivers, increasing marine influence



Bourquin et al. (2006)

Analysis of sedimentary sequences

-initial situation-

- discontinuous distribution of outcrops
- basal (P/T boundary) and uppermost (“conglomerat principal”) boundaries should be present

Analysis of sedimentary sequences -methods-

- Only 1 well entirely cored (Rhine Graben)
- Borehole Geophysics:
 - gamma-ray (GR)
 - sonic
 - resistivity
- Well-log correlation (580)

Analysis of sedimentary sequences -facies-

- P/T-boundary: high GR/ sonic
- Middle Buntsandstein:
 - monogenetic/ polygenetic conglomerates (low GR)
 - sandstones with thin clay interbeds
 - → braided rivers + floodplain in arid environment
- Upper Buntsandstein
 - sandstones, siltstones
 - high GR (50-170 API)
 - → low sinuosity rivers, floodplains, lacustrine facies
 - Increasing marine influence

Sequence stratigraphy -refresher-

- Genetic unit:
 - condensed lower part
 - aggrading upper part
 - each unit bound by 2 mfs
- Autocyclic vs. Allocyclic events
- Vertical stacking of genetic units
- Correlation of sequences at the scale of a formation
- In our case: Pre-Triassic – Middle Muschelkalk

Sequence stratigraphy

-Buntsandstein-

- Lower/ Middle: 15-40m units
- Upper: 4-15m units
- stacking of units → unit sets, cycles
- Sometimes mfs uncertain