Multi-stage detachment localization and evolution of the Akapnou Forest Oceanic Core Complex, Troodos Ophiolite, Cyprus

Marit W. Jeijsman[1], Peter Hegeman[1], Richard J.F. Wessels[2], Vasilis Symeou[3], Anouk Beniest[1]

1. Department of Earth Sciences, Faculty of Science, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands
2. Department of Earth Sciences, Utrecht University, Utrecht, The Netherlands
3. Cyprus Geological Survey Department, Lefkosia, Cyprus

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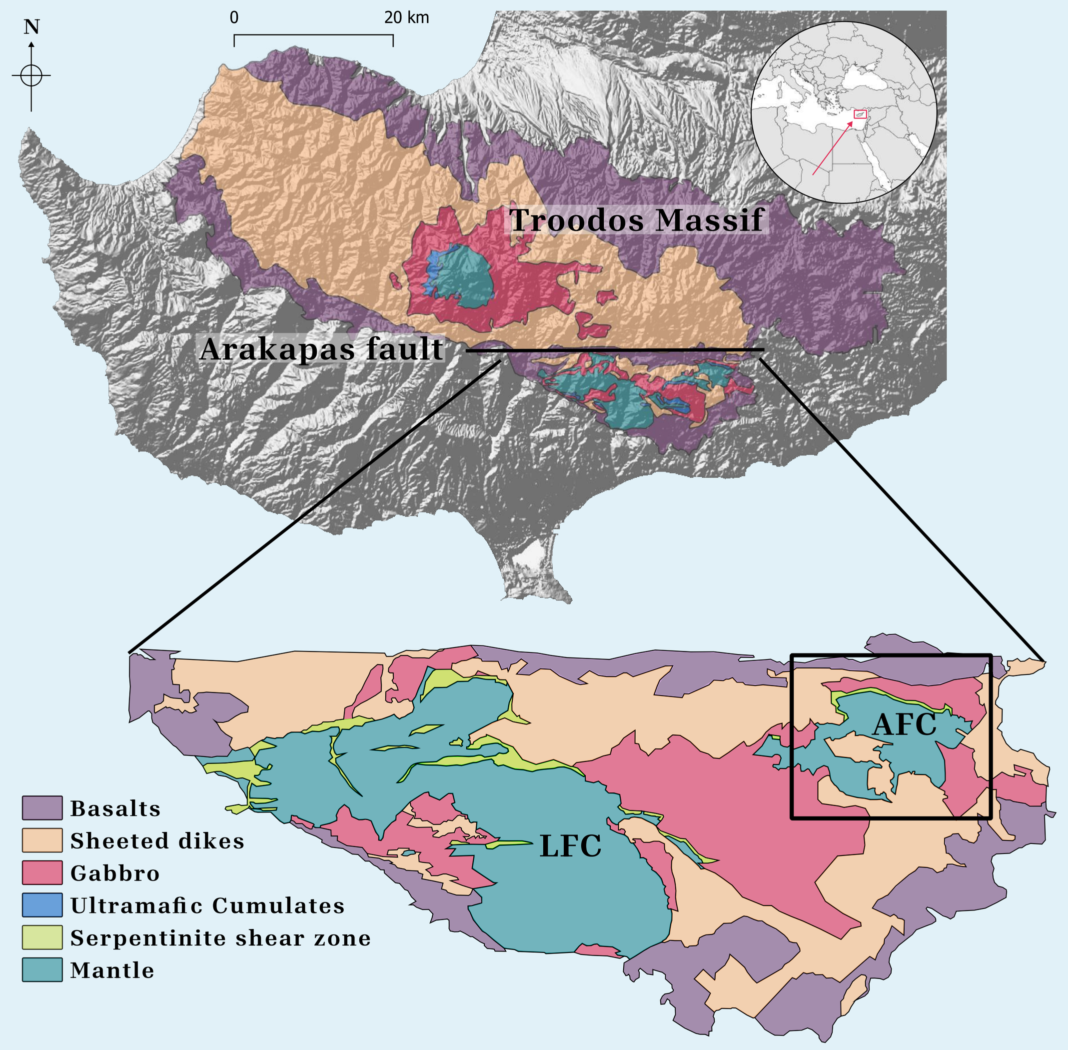
1 Introduction

The Troodos Ophiolite is one of the most well-preserved **ophiolites** in the world. However, most of this research has focused on the best-preserved northern Troodos Massif, while the Limassol Forest Complex (LFC) and **Akapnou Forest Complex (AFC),** separated from the Troodos Massif by the Arakapas Fault Belt (AFB), have received comparatively limited attention.

Two theories on the origin of mantle lithologies in LFC and AFC:

- **Leaky transform fault zone** [1] [2] [3] [4]
- **Oceanic core complex** [5] [6]

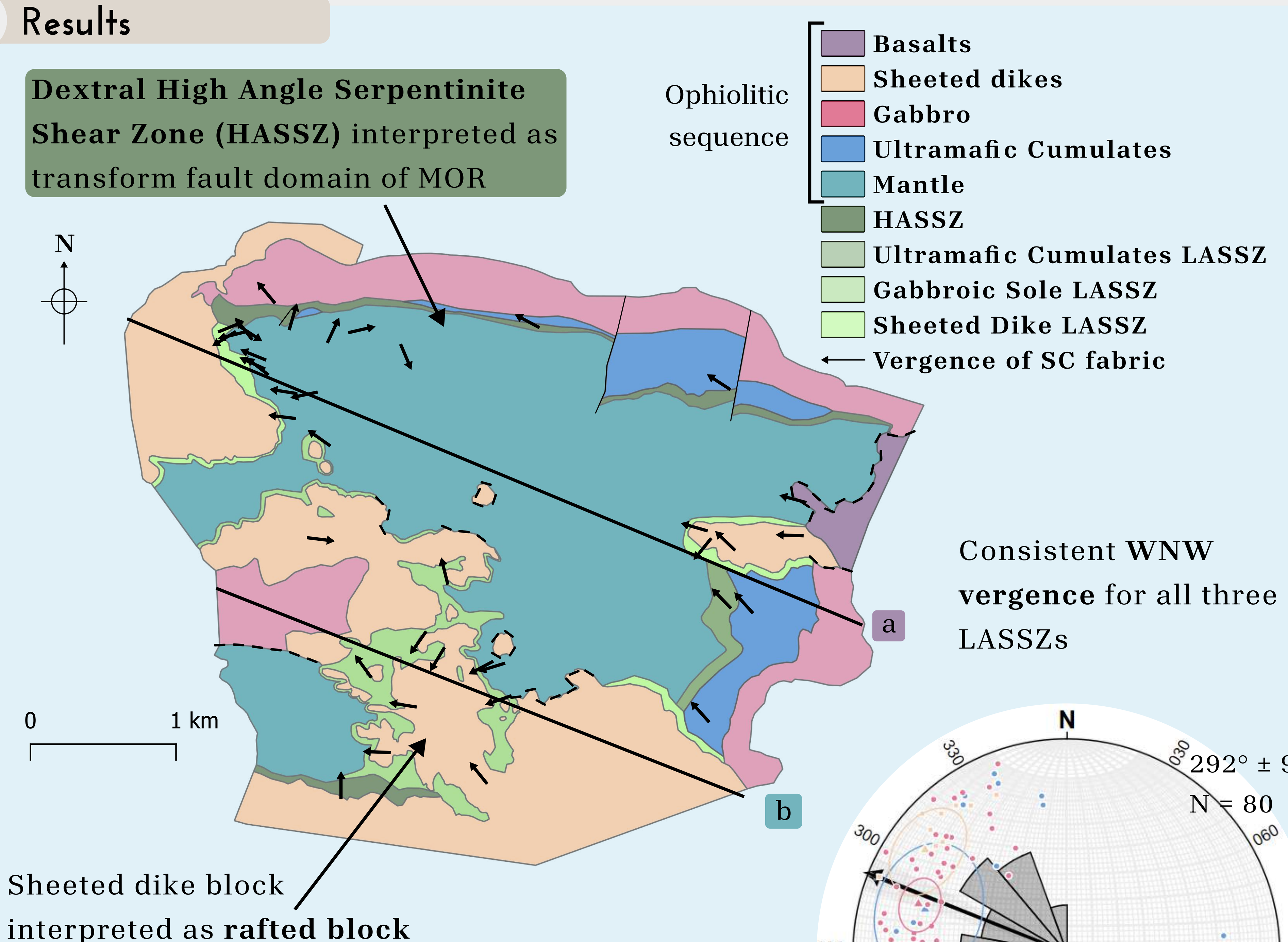


2 Objective

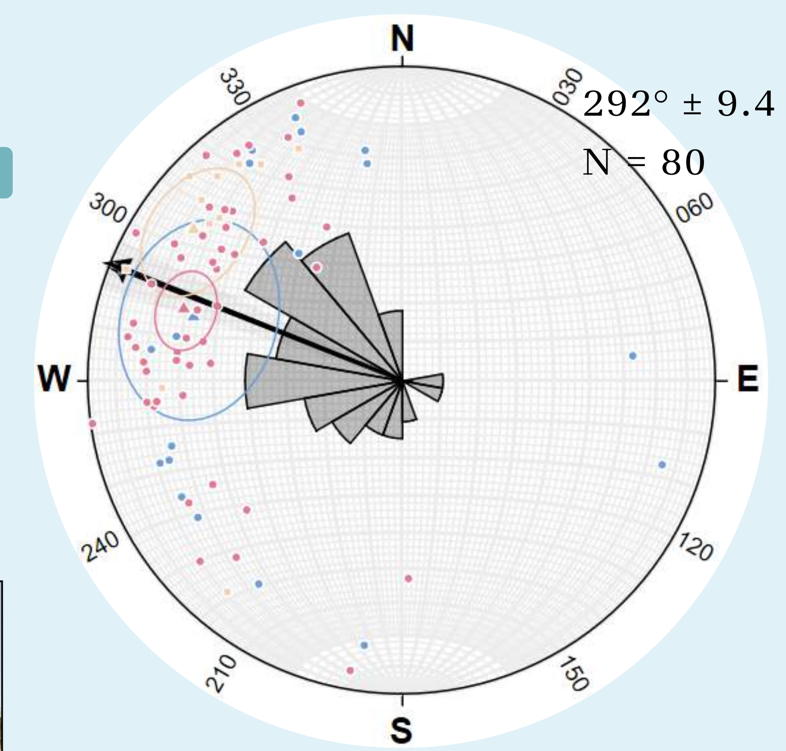
This study investigates the kinematics and structural characteristics of tectonic contacts surrounding the AFC within the STFZ, using **field mapping and drone-based photogrammetric models** to determine the tectonic origin of this complex.

The research focuses on the **Akapnou Forest Detachment (AFD)** and its overlying lithologies by analyzing detachment kinematics as well as footwall and hanging-wall contacts of the AFD.

3 Results

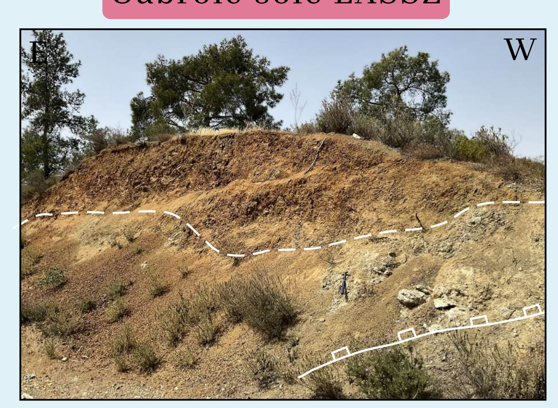


Consistent **WNW vergence** for all three LASSZs



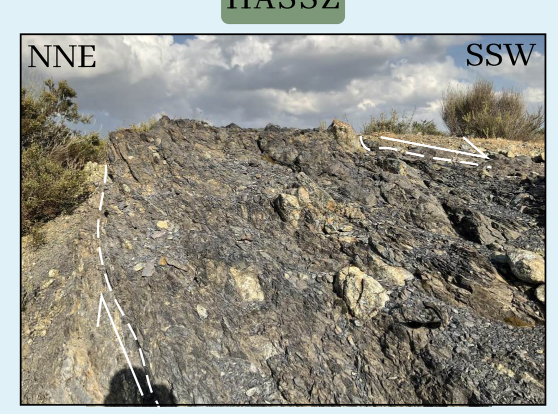
Sheeted dike LASSZ

Gabroic sole LASSZ

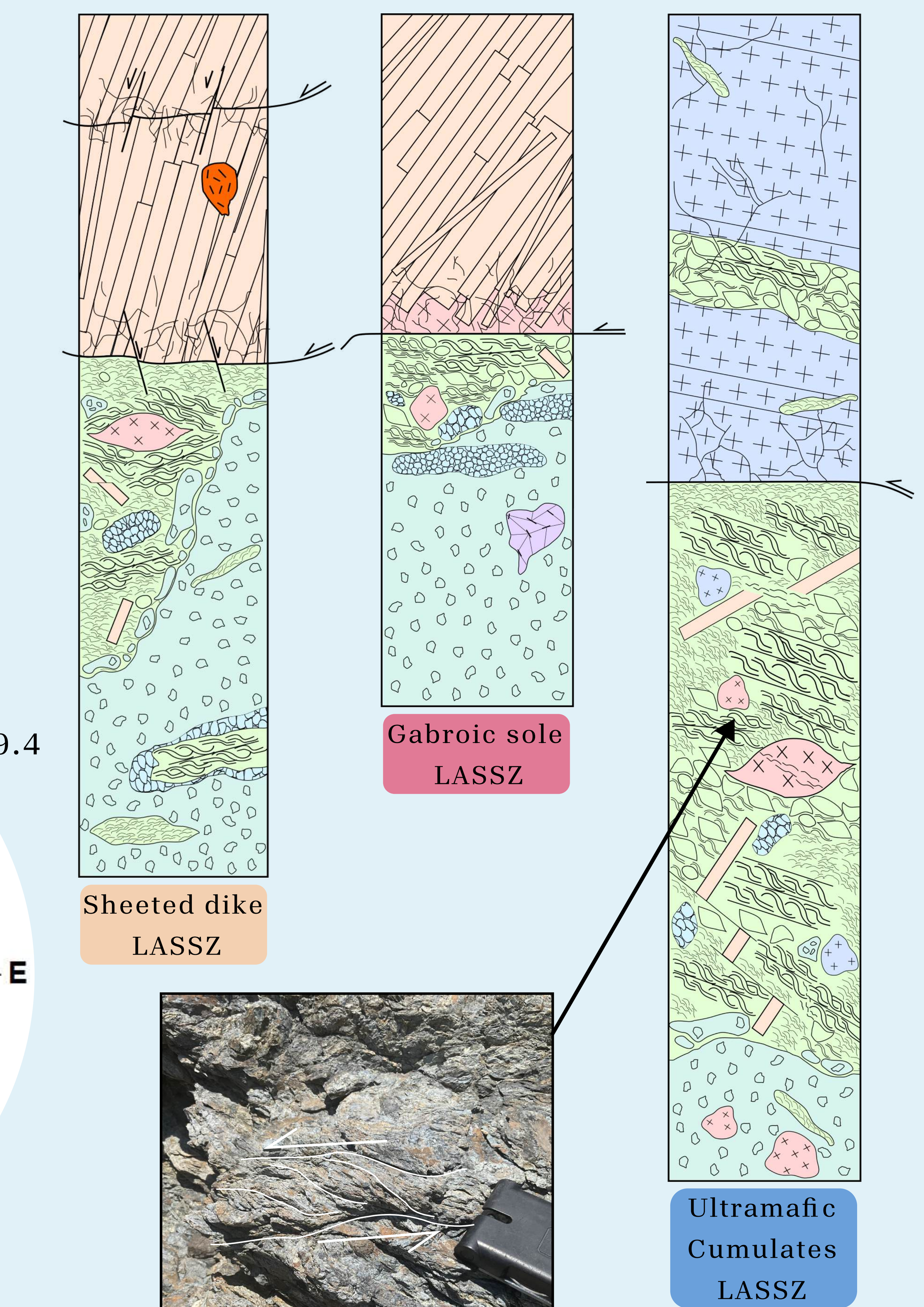


Ultramafic Cumulates LASSZ

HASSZ

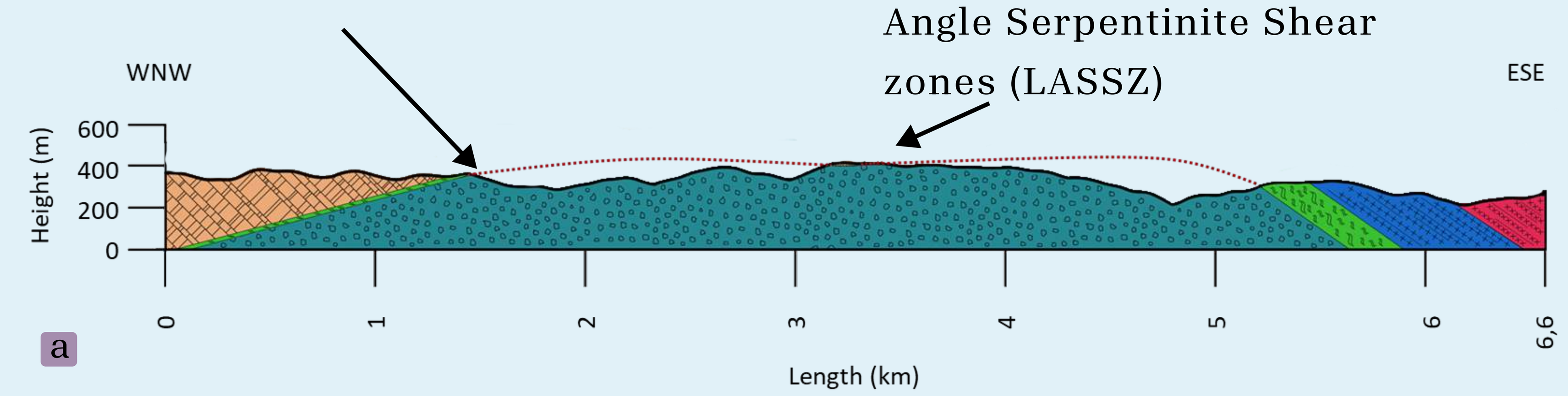


3 types LASSZs indicating **multiple stages** of the detachment systems



Largest stratigraphic omission in WNW

Domal geometry of 3 Low Angle Serpentinite Shear zones (LASSZ)



References

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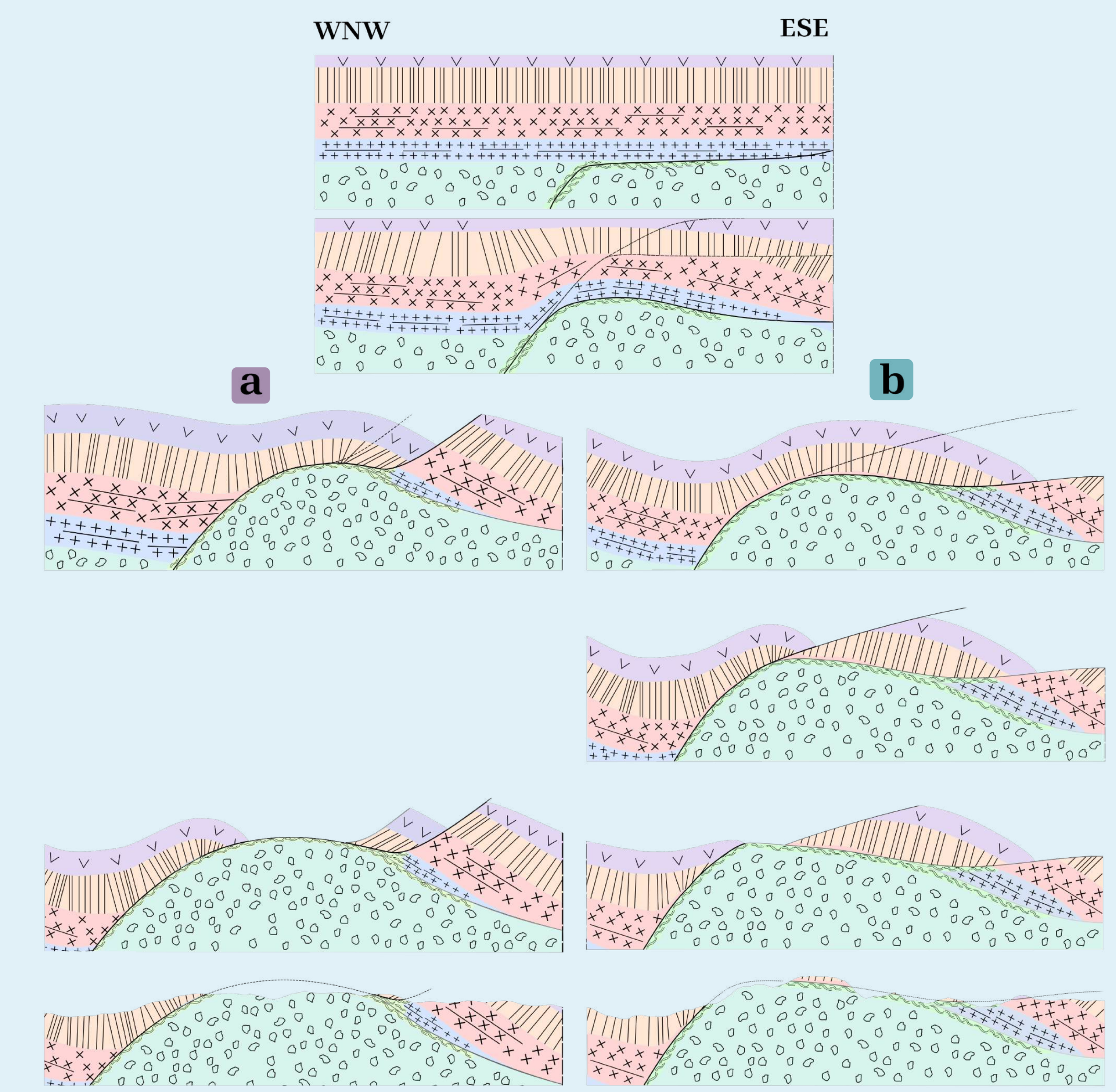
4 Discussion

This study establishes the AFC as a **fossil oceanic core complex**, as it exhibits the key charcteristics typical of OCCs, including 1) dome-shaped morpthology exposing deep lithosperhic material, 2) **low-angle detachment faults that controlled exhumation** and 3) WNW vergence sub-parallel to the paleo-spreading direction.

When acknowledging the AFC as an OCC and the LASSZs as the detachment faults along which it got exhumed, it allows us to create a **conceptual model for the exhumation of the AFC.**



Central part of the study area with slip along a shallower horizon represented by the sheeted dike-gabbro transition

Southwestern part of the study area with locking up of the fault creating a rafted block

5 Conclusions

1. The AFC represents a **fossil oceanic core complex.**

2. The exhumation of the AFC occurred through a **multi-stage detachment process**, in which different detachment horizons were active temporally and possible laterally.

3. This study gave **insights into OCCs and detachment faulting within the oceanic domain** close to MORs.