

Petrographic analysis and palaeoenvironmental reconstruction of density flow deposits in the Orbuklukeli section, Mersin Mélange, Southern Turkey

Introduction

During the late Triassic period there were several environmental changes and one of them was the extinction at the Norian – Rhaetian boundary (NRB) which was the most distinctive. Large carbonate platforms were produced along the Tethys ocean and was periodically deposited on deeper parts of the ocean floor.

Petrographic analysis of eleven samples from six density flows in the Orbuklukeli-section in the Tavuscayiri-block, Mersin melange, southern Turkey, was carried out to interpret origin environments and transport mechanisms of these density flows. The study period includes an interval in late Triassic between Norian to Rhaetian periods which is a period of significant environmental changes at the Norian-Rhaetian boundary (NRB). Tools like Dunham (1962) classification, bioclast identification and cement identifications was used to interpret the paleoenvironments.

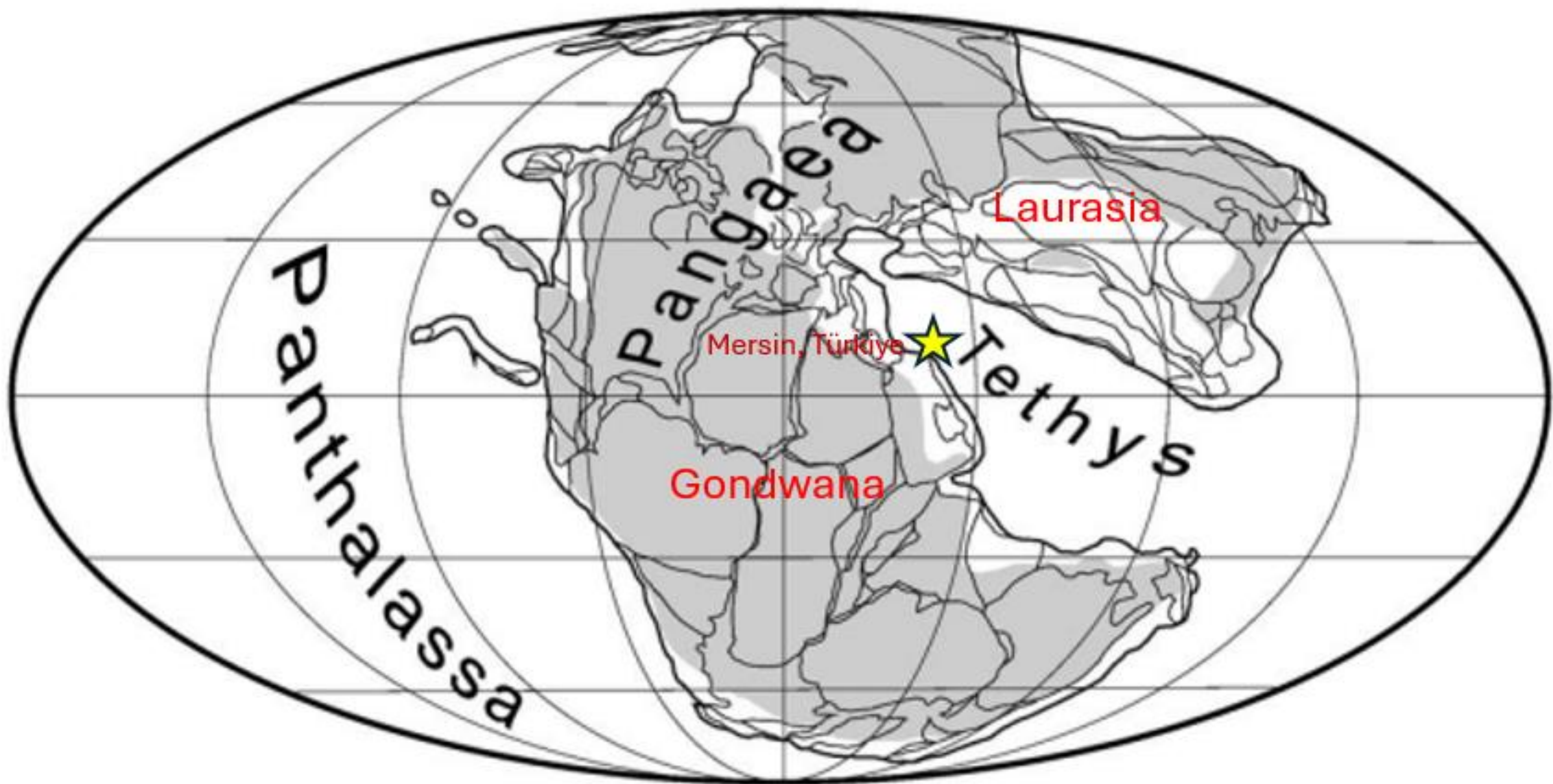


Figure displaying Pangea during late Triassic. The star is an estimation of where the study region originated during late Triassic.

Results and disscusion

The results indicate that the density flows come from different environments with density flow 1 (DF1) is interpreted to originate from shallow water environments with indicators of *dasycladales* (green algae) and botryoidal cement. There is also an interpretation for density flow 1 which interpret a hydrothermal seamount-collapse and is supported by hydrocarbons found in SEM-analysis. Density flows 2 – 6 (DF2-6) is interpreted to mainly originate from slope to outer shelf environments where indicators like bivalve filaments, crinoids, calcispheres and tubiphytes support this interpretation.

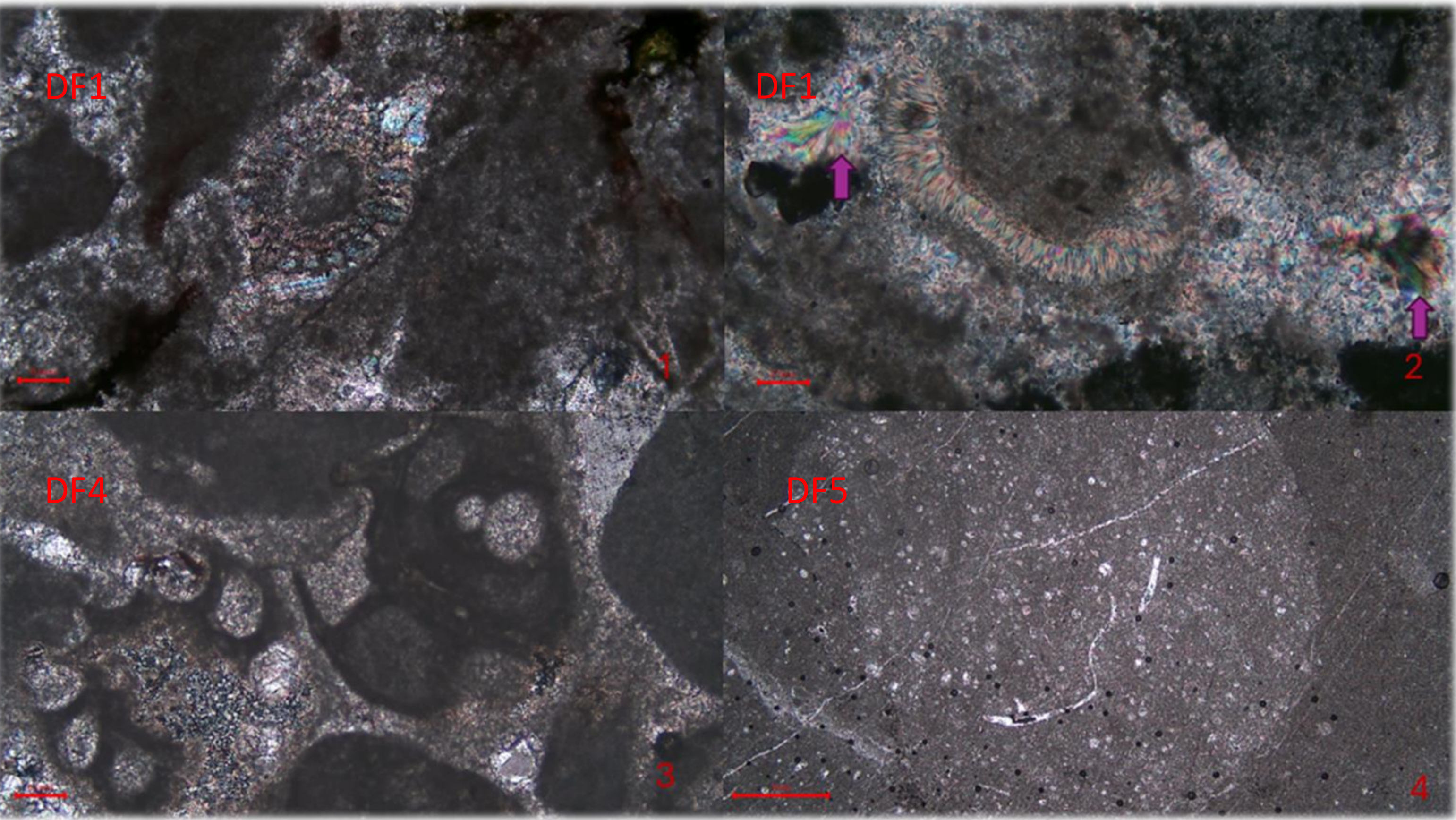


Figure displaying microscope views of indicators. 1: *Dasycladales* (Green algae) identified for its rounded structure, radial lateral pores and a void at the centre. 2: Botryoidal cement which is highlighted by the pink arrows. 3: Tubiphytes shown within the matrix. 4: View over bioclasts and calcispheres within a sample.

Method

Samples for this project were collected in Turkey, Mersin province at an outcrop called Orbuklukeli (36°55'17"N, 34°13'30"E). Thin-sections was then prepared with the use of a saw-machine, sandpapering and grinding with machines to reach a thickness of the rock that makes it able to be translucent and suitable for microscoping. The two samples OR26 and OR27 have also been analysed with Scanning Electron Microscopy (SEM).

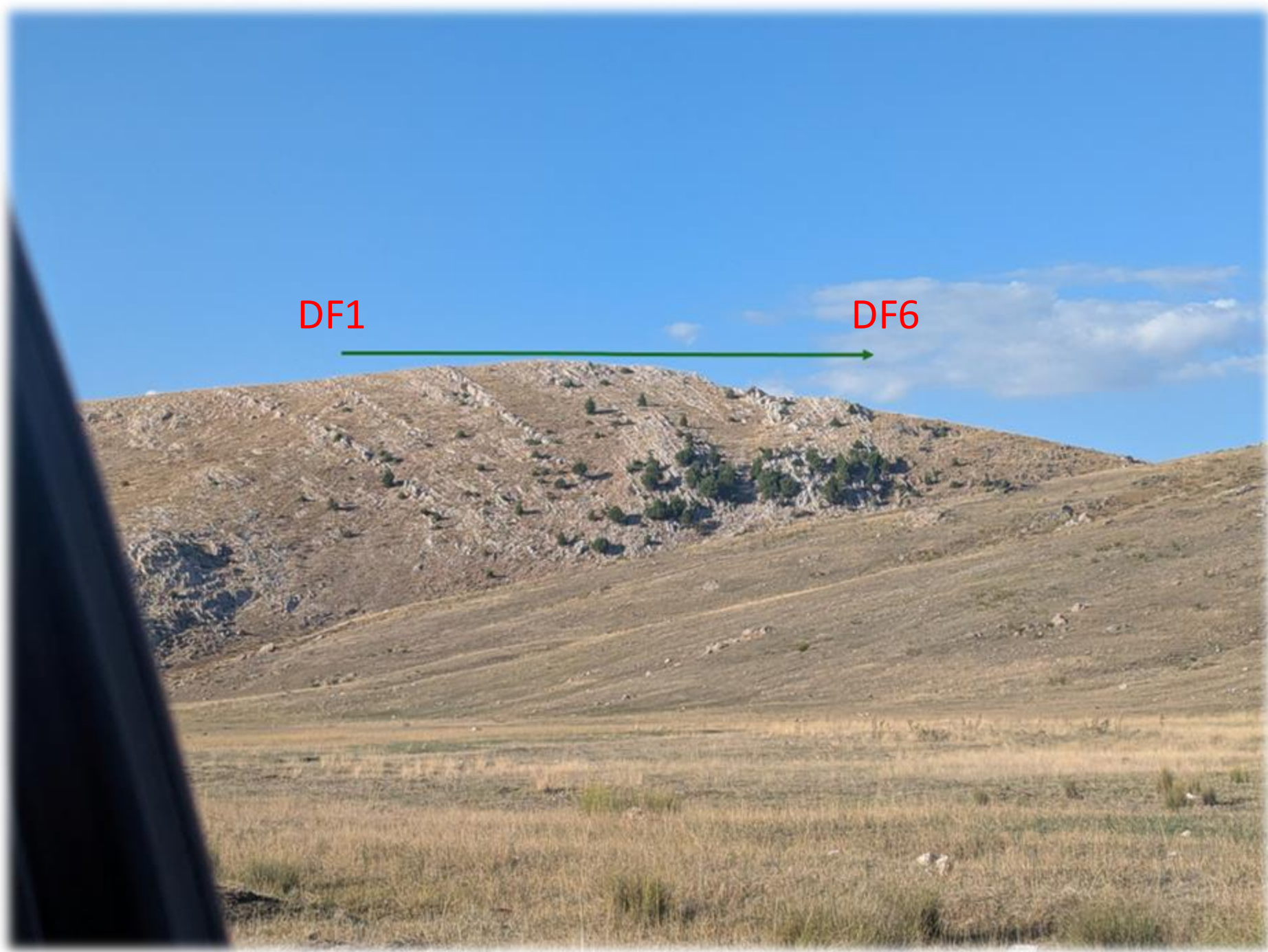


Figure displaying the Orbruklukeli section and an arrow estimating DF1 to DF6



Figure showing method processes for this study. 1: All eleven samples in plastic bags in the thin-section laboratory. 2: density flow 1 (DF1) in field. 3: The sandpapering machine. 4: The sawing machine.



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Selected references

Tekin, U. K., Krystyn, L., Okuyucu, C., Bedi, Y., & Sayit, K. (2020). Late Triassic to Early Jurassic radiolarian, conodont and ammonite assemblages from the Tavuscayiri block, Mersin Mélange, southern Turkey: Time constraints for the T/J boundary and sedimentary evolution of the southern margin of the northern Neotethys. *Geodiversitas*, 42(27).

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