# Melt movement by dilation-assisted compaction, Damara Belt, Namibia

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Melt migration through the crust is the main mechanism that facilitates upward movement of heat and mass and the chemical differentiation of the continental crust. Crustal-scale melt movement is divided into three phases; segregation from the source, migration and ascent, and emplacement[1]. Whereas the processes of segregation and emplacement are relatively well understood, melt ascent mechanisms are more speculative.

We document an example of long-lived syn-deformational melt migration through an 80m-thick upper-amphibolite facies, subsolidus metasedimentary sequence in the southern Central Zone of the Damara Belt, Namibia. The package is shallowly-dipping and structurally bound by migmatitic gneisses at the top and bottom. The metasediments have not experienced extensive anatexis, and preserved leucosome represents migration and emplacement from the underlying migmatitic gneisses (melt source) into the metasediments.

The position and orientation of the leucogranites is structurally and lithologically controlled, and defines a composite 3D network of intersecting sheets and stringers on the metre to decametre-scale. Structures that comprise the networks include fabric-concordant sheets, sheets and dykes within conjugate shear zone planes, and leucogranite-bearing boudin necks, tensile fractures and leucogranite-cemented breccias. The deformation along the conjugate shears indicates that melt migration occurred during tectonic compaction of the sequence. The presence of at least five compositionally and texturally distinct leucogranite phases of different volume shows that structures within the network were repeatedly utilized by separate melt batches over a protracted period of time.

Low-volume melts achieved ascent through stepwise pervasive migration, controlled by the rate at which structures were able to dilate and create permeability during progressive deformation. High-volume melts ascended rapidly and in a single pulse along 10-25m diameter pipes that crosscut the entire supracrustal sequence. These pipes contain leucogranite-cemented breccias consisting of 5-10m angular and rotated wall-rock fragments. This suggests rapid opening of the fractures followed by implosion of the country rocks.

The different leucogranite phases indicate a repeated and long-lived utilization of networked structures formed during regional deformation. However, low melt volumes exploited these networks passively as the rate of tectonic dilation was sufficient to accommodate the low melt volumes. In contrast, high melt volumes contributed additional permeability to the network through fracturing and brecciation, driven by melt embrittlement and overpressure as melt supply exceeded the rate of tectonic dilation.

[1] Brown (2007) *Journal of the Geological Society* **164**, 709-730.

# How do oceanic biotic components influence the production mechanism of organic aerosol in Marine Boundary Layer (MBL)?

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Studies performed during the past years strongly suggest that biogenic organic compounds play an important role in submicron marine aerosol chemical composition over biologically productive, high latitude, marine regions, in both hemispheres and new biogenic oceanic sources of primary and secondary origin of OA were revealed. We discuss on the global importance of biogenic OA marine sources and their high spatial and temporal variability and the complex interaction with gaseous biogenic precursors and oceanic biotic components (Phytoplankton, viruses and bacteria). Submicron marine organic aerosol are a complex mixture of biogenic materials transferred from the ocean surface by the sea spray or by oxidative gas to particle conversion of volatile organics emitted by decomposition processes of oceanic dissolved organic carbon. The role of marine biota on the evolution of plankton bloom and on the partitioning of oceanic organic carbon in POC and DOC or gaseous species and on transfer mechanisms into MBL will be discussed.