Leuconoritic dikes: new evidence for injected crystal mushes from the Löyning lens (Egersund-Ogna Massif, Rogaland, Norway)

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The Löyning lens, 200 m-thick and 1.5 km-long, is located in the foliated inner margin of the Egersund-Ogna anorthositic massif. It is made up of mafic and ultramafic layered rocks at the bottom (norites, melanorites, olivine orthopyroxenites) grading towards homogeneous leuconorites at the top. The rocks are adcumulates with virtually no cryptic variation in the mafic mineral compositions. This implies near-equilibrium cotectic crystallization conditions.

Though there is no chilled margin, the Cr content of the opx (150-300 ppm) points to a parental magma of basaltic composition.

The leuconorite (CI = 26-28) from the upper part are injected in the roof of the intrusion as thin fine-grained, equigranular dikes. They show Mg number between 0.64 and 0.68, low LILE contents, low La_N/Yb_N ratios (2.5-2.7) and strong positive Eu anomalies (Eu/Eu*= 9-15).

Application of olivine/melt equilibrium partition coefficients (Ford et al. 1983) shows that the dikes cannot crystallize the olivine (Fo_{62-65}) found in the lower cumulates, nor represent a suspension of plagioclase in a liquid of the appropriate composition. On the other hand, the similarity between the Mg numbers of the leuconorite and of the olivine or opx strongly suggests that the dikes are simply made up of an injected cumulate with very small amounts of interstitial liquid.

Ref.: FORD CE, RUSSEL DG, CRAVEN JA, FISK NR, 1983, J. Petrol. 24, 256-263.

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