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UNRAVELLING THE MAGMATIC ARCHITECTURE OF RIFT-RELATED GRANITIC BATHOLITHS: PERSPECTIVES FROM AMPHIBOLE AND FELDSPAR

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Through the integration of petrographic and in-situ geochemical studies of granitic batholiths crystal cargoes, the processes associated with granitoid magmatism can be unraveled. The *c*. 300Ma Oslo Rift in SE Norway contains ~63,000km^3 of chemically diverse magmatic rocks, including the Drammen (Dr) (1,811km^3) and the Finnemarka (Fin) (336km^3) batholiths. In this study, the mineralogy and chemistry of these batholiths is utilized to evaluate the petrogenesis of chemically evolved magmas within continental rift settings. Sampled granitic lithologies are predominantly composed of Qz, K-Fsp, Plg, Bt, ± Amph, with minor Ttn ± Ap ± Zrc. Bulk rock major elements from 45 samples classify these granites as peraluminous to metaluminous with trace elements (e.g. Y vs. Nb and 10^4 x Ga/Al vs. Ce) broadly consistent with compositions expected from within-plate granitic magmas. Feldspar populations throughout the sampled suite are zoned (as revealed by CL) and are dominated by sanidine (n=304) and albite (n=155) compositions, with minor oligoclase (n=77) and anorthoclase (n=34). Ce/Ce* vs. Eu/Eu* signatures within Fin fsps form two distinct chemical groups. Group 1 (n=139) exhibits Ce/Ce* at <0.1, Eu/Eu* up to 40, and is consistent with signatures from Dr fsps collected to date (n=78). Group 1 signatures are also geographically consistent with the northern portion of the Fin batholith. Group 2 (n=466) exhibits Ce/Ce* from 0.1 to ≤1.2, displays Eu/Eu* up to 1000, and is geographically consistent with the middle and southern areas of the Fin batholith. This chemical and spatial variation could be interpreted as recording the involvement of at least 2 distinct chemical reservoirs during construction of the Fin batholith. Amphiboles are classified as calcic by their elemental signatures (Si 5.5 to 8 apfu; (Mg/(Mg+Fe^{2+}) 0 to 1.0). Their wt.% TiO_2 and Al_2O_3 signatures are broadly consistent with derivation from a crustal source (Al_2O_3<11, n=128) with a lack of mantle-derived amphs (Al_2O_3>11, n=3). This implies that partial melting of pre-existing crustal lithologies also played a role during the petrogenesis of these batholiths, which would be broadly consistent with bulk rock peraluminous signatures. Future analyses will include bulk rock Sr-Nd-Pb isotopes and trace elements from amphs and fsps within the remaining lithologies.

Session No. 41--Booth# 300

T138. Magmas Assemble! Petrologic, Geochemical, Chronologic, and Geophysical Insights into the Architecture and Timescales of Magmatic Systems (Posters)
Sunday, 4 November 2018: 9:00 AM-5:30 PM

Halls J-K (Indiana Convention Center)

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