

Intermediate arc magmatism and crustal evolution: The view from big(ger) data.

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Convergent margin systems are characterized by uniquely high production rates of intermediate and silicic magmas. Compositional characteristics of these magmas are shared by bulk average continental crust, and thus there has been a longstanding interest in the role of convergent magma systems in crustal production and evolution. Despite this little clear consensus exists about the dominant processes that control formation of intermediate magmas in arc settings. Key questions include the roles of fractionation vs. mixing; the relationships between magmatic and liquid compositions; and the interplay between plutonic and volcanic processes.

This presentation will summarize recent results regarding the origin of intermediate magmas within subduction zones, and the relationship between magmatism and crustal growth, focussing on large global petrologic data sets as a source of information. Extensive data for rock, melt inclusion, and mineral compositions are widely available. Coupled with increasing sophistication of approaches to interpretation, these data sets provide important insights into the origin of intermediate magmas in convergent margins, and the role of magmatism in crustal evolution. However differences of opinion still persist; for example, some data sets indicate the importance of high level mixing processes in the generation of intermediate magmas, whereas others are interpreted to reflect the importance of fractionation. Despite these on going issues the application of big(ger) data provides important means for identifying important processes and testing models of convergent margin processes and crustal growth.