

OCGC Seminar

The temporal link between the Paraná LIP volcanism and the Valanginian event

Dr. Brenda Chung da Rocha

Assistant Professor in the Department of Mineralogy and Tectonics, Geosciences Institute,
University of Sao Paulo (USP)

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Click below for the Zoom link to the lecture:

<https://us02web.zoom.us/j/82720647721?pwd=bjF1UzFrT0NwS2loc3FZRkFZeFhCdz09>

Abstract:

The Valanginian is marked by a period of global-scale carbon cycle perturbation and biotic crisis, as evidenced by a positive $\delta^{13}\text{C}$ excursion and Hg enrichment in the sedimentary record. Several studies have attempted to link the Paraná-Etendeka large igneous province volcanism with the Valanginian event. However, such temporal correlation requires knowledge about the precise timing and duration of the volcanic activity, which is still poorly constrained in the Paraná LIP. In this study, we significantly revise the timescales of magmatism and environmental impact of the Paraná Magmatic Province (PMP) in Brazil with new high-precision zircon U-Pb ages from the low-Ti Palmas and high-Ti Chapecó sequences obtained by chemical abrasion-isotope dilution-thermal ionization mass spectrometry (CA-ID-TIMS). Our data demonstrates that significant volumes of low-Ti silicic rocks from the PMP erupted rapidly at ca. 133.6 Ma, within an extremely narrow time interval of 0.12 ± 0.11 ky, providing evidence for short duration of the main magmatic event of the PMP (< 100 ka). The age of the high-Ti Chapecó sequence from central PMP is constrained at ca. 132.9 Ma and thus extends the duration of magmatic activity by ~ 700 ky. Our new high-precision ages are systematically younger than previously accepted and postdate the major positive carbon isotope excursion. This further reinforces the hypothesis that the PMP silicic magmatism was likely not the triggering mechanism for the Valanginian Event but could have contributed to extending its duration. Within the framework of the stratigraphic column of the PMP, the earliest low-Ti basalts could have been responsible for the Valanginian Event if they are at least 0.5 m.y. older than the low-Ti silicic rocks dated herein.

Brief biographic statement

My research is focused on the investigation of igneous and metamorphic processes related to the formation of orogenic belts and evolution of the continental crust, using a petrochronology approach. Additionally, I have conducted research on the environmental impact of the Paraná Large Igneous Province magmatism using high-precision geochronology.

Departamento de Mineralogia e Geotectônica, Instituto de Geociências, Universidade de São Paulo

Rua do Lago, 562 Cidade Universitária, São Paulo – SP, Brazil

(brenda.rocha@usp.br)



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