

Connecting Changes in Volcanic Activity to Glacial-Climates Over the Last ~6 Ma from Central America to the Central Andes

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An increase in volcanic activity due to glaciations has been documented mainly during the last glacial to interglacial transition. In general, studies have tended to focus in the Northern Hemisphere, around volcanic settings, and there is less evidence to date of possible volcanic-climate-glacier linkages in South and Central America. In this project, we studied marine cores from the International Ocean Drilling Program (ODP/IODP), focusing on Leg 202 west of the shores of South and Central America. We analyzed the number of ash layers, physical descriptions, and measured thicknesses, which provide data on the amount and size of eruptions in these regions. Many of the Leg 202 cores date back to before ~3Ma, but we focused in particular on evidence during and after the Mid-Pleistocene and the Plio-Pleistocene transitions. In addition to observations in the initial reports, we compared the ash records with $\delta^{18}\text{O}$ (LR04 timeseries) and magnetic susceptibility; $\delta^{18}\text{O}$ is used as a global climate change proxy for the latest Cenozoic Era. We found well-preserved records of ashes where at least three increased pulses were documented at certain times. When comparing the entire record through the last ~10 Ma, there is an increase in volcanic activity after the Mid-Pleistocene Transition around ~1-0.7 Ma and the Plio-Pleistocene Transition around ~3-2.6 Ma. In Leg 202 cores, there is a less obvious relation though between ash thickness and time. These observations suggest that glaciations or glacial cycles in general around these times affected volcanic activity, as more ashes occurred during and after the transitions. Ongoing research will help to test further possible connections between glaciations and volcanic activity recorded in Leg 202 cores.