Additional material to display D3328 | EGU2020-4578:

Effects of tropical precipitation variability on the composition of fluvial sediments from SE Brazil in glacial and interglacial times (MIS 6-5)

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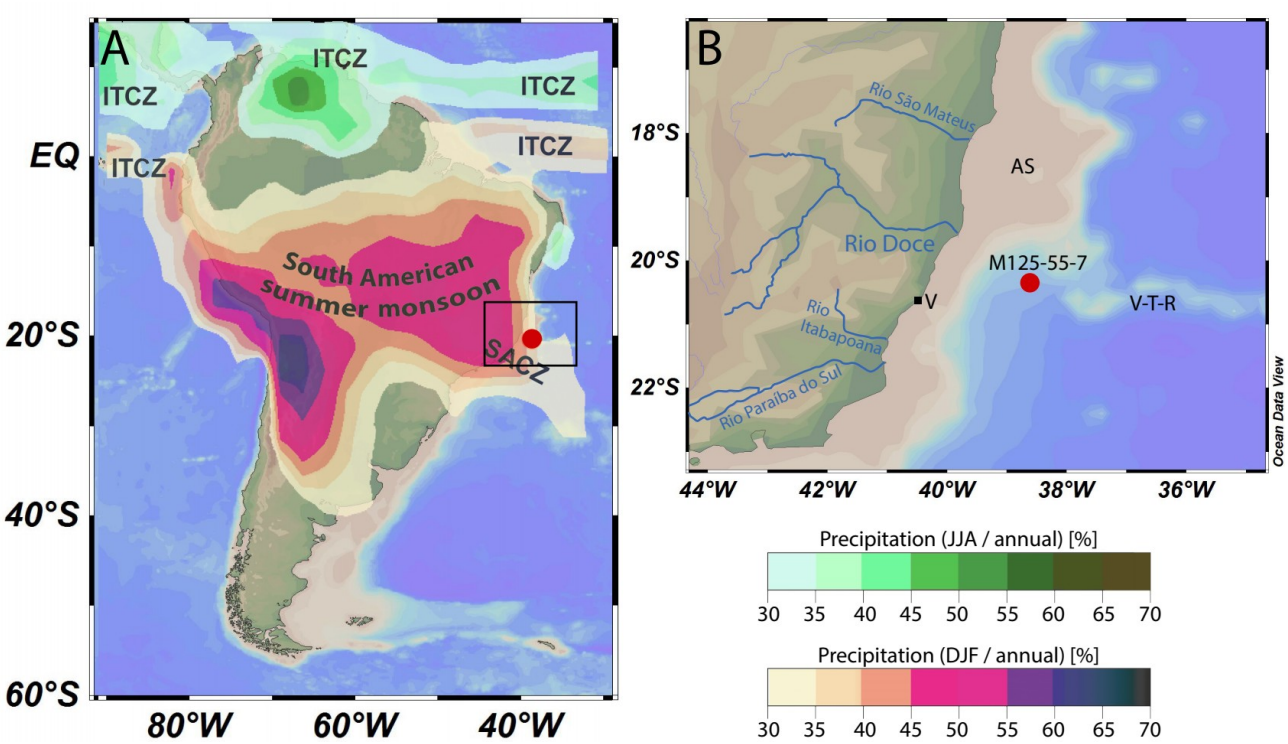


Figure 1: A: The coring site, marked with a red dot, is on the margin of the South Atlantic Convergence Zone (SACZ) a convective band of strong precipitation that forms during austral summer. Indicated is further the seasonal precipitation distribution across South America with rainfall percentages relative to the annual mean during austral summer (December, January February) displayed in red to purple colours and during austral winter (June, July and August) in green colours; ITCZ – Intertropical Convergence Zone. Adapted from Flantua et al. (2016) and Vuille et al. (2012). B: The river mouth of the Rio Doce is close to the core site (red dot). The Abrolhos Shelf (AS) and the Vitória-Trinidade Ridge (V-T-R) are situated north and east of the core site. The city of Vitória is indicated with a “V”.

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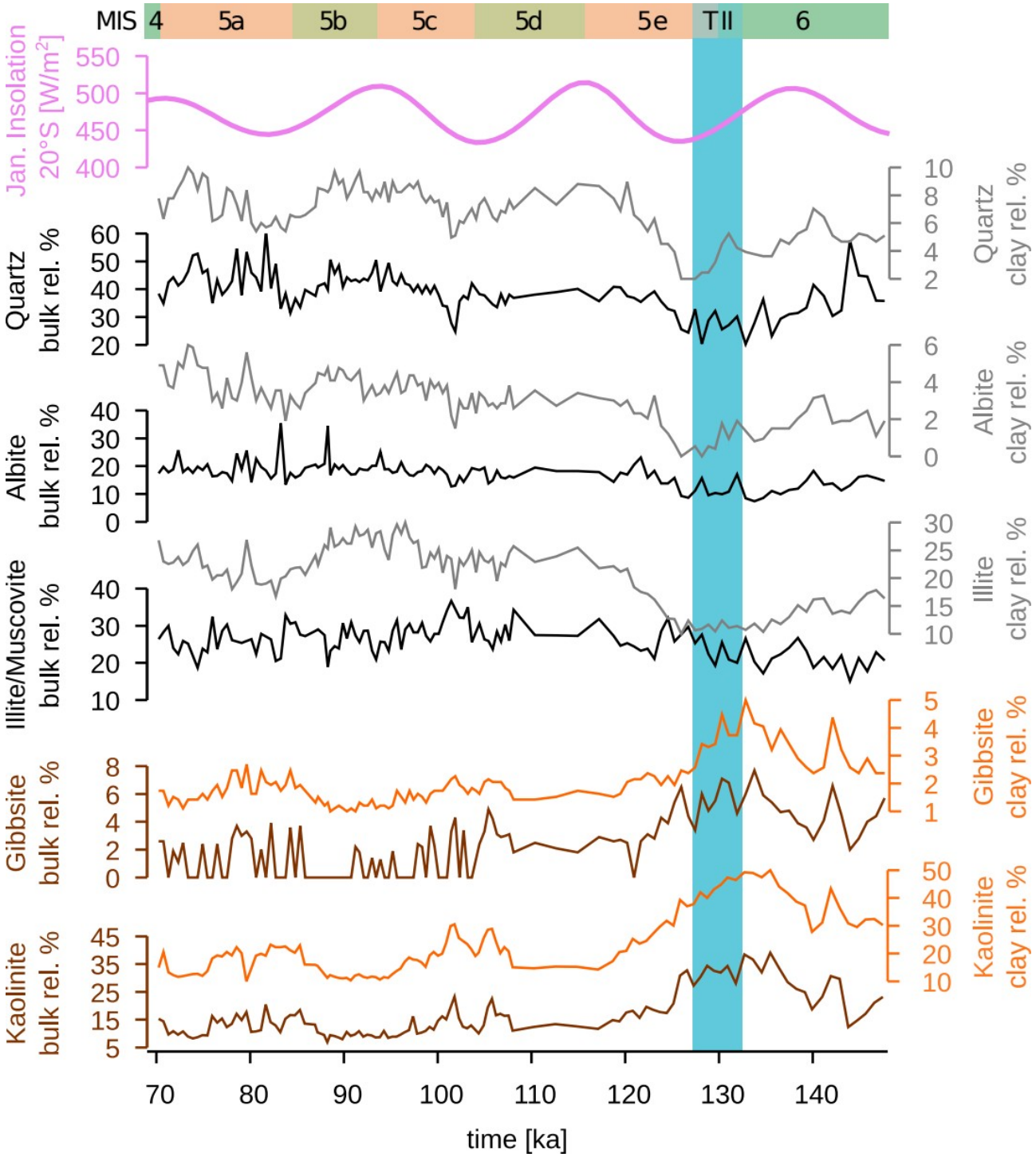


Figure 2: Results from the semi-quantitative mineral phase analysis via X-ray diffractometry (XRD). The black and brown curves depict the development of the river discharge phases within the bulk sediment. The grey and orange curves show the development of the same phases when measuring the decarbonized clay sized fraction only. Phases displayed in black and grey are primarily derived from eroded parent rock material and correlate positively with the 20° S January insolation during Marine Isotope Stage (MIS) 5, as seen best in the clay fraction. If a trend is visible in MIS 6, the parent rock derived phases show low values compared to MIS 5. Phases displayed in brown and orange are mainly delivered through soil erosion and show a negative correlation with insolation in MIS 5. In MIS 6 the abundance of these phases is increased. The 20° S January insolation curve was calculated with the astronomical solution provided by Laskar et al. (2004). MIS boundaries are drawn after Lisiecki and Raymo (2005) and MIS 5 substage boundaries after Cohen and Gibbard (2012).

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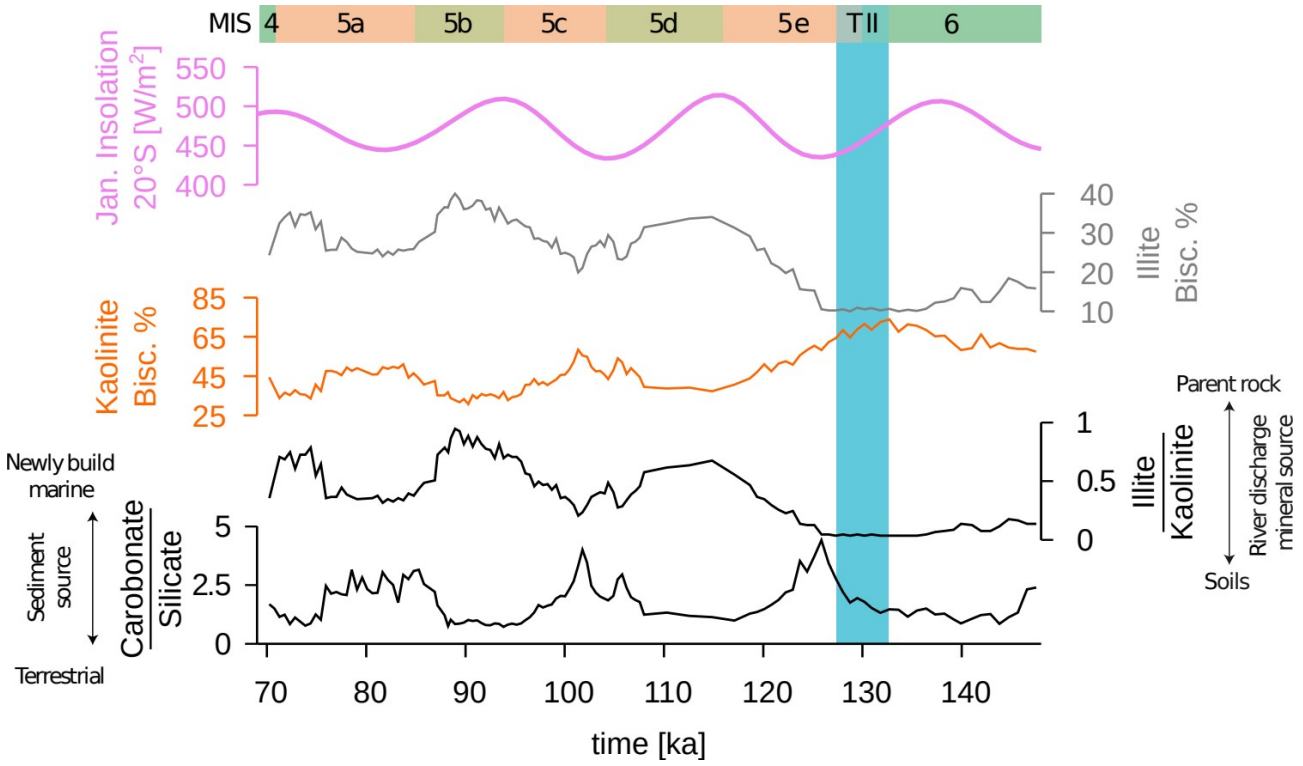


Figure 3: A clearer illite and kaolinite signal is achieved when comparing clay minerals only. For this purpose textured samples are produced from clay powder, allowing the sheet like clay minerals to be aligned horizontally prior to the XRD measurement and thus increasing the precision of relative clay mineral abundance in Biscaye %. Illite shows a positive correlation, while kaolinite correlates negatively with insolation. The illite-to-kaolinite ratio emphasises the opposing trends of the two phases. Through the carbonate-to-silicate ratio the proportion of river discharge can be assessed. During MIS 5 the silicate content is increased in periods of high insolation, During late MIS 6 the silicate content is high. The 20° S January insolation curve was calculated with the astronomical solution provided by Laskar et al. (2004). MIS boundaries are drawn after Lisiecki and Raymo (2005) and MIS 5 substage boundaries after Cohen and Gibbard (2012).

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