TRANS-AMAZON DRILLING PROJECT

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ABSTRACT: The Amazon/Andes of tropical South America is a key region on Earth, and its rainforests host over half of all terrestrial plant species. The forests and their biota have evolved together with the physical landscape, closely linking processes in the Earth's interior with surface climate and landscapes, ecosystems, and biodiversity. The proposed Trans-Amazon Drilling Project will address fundamental questions about the geologic and biotic evolution of the Amazon, focusing on (1) how Cenozoic climate and geologic history, including uplift of the Andes and development of the transcontinental Amazon River, influenced the origins of the Amazon rainforest and its incomparable biodiversity; and (2) the timing and development of the Amazon River (and the fan deposition), and the paleoceanographic history of the western equatorial Atlantic. These goals require long sedimentary records, which, in most of the Amazon region, can only be obtained by drilling. We propose to drill the entire Cenozoic sequence in five continental sites in the Acre, Solimões, Amazonas and Marajó sedimentary basins that are aligned along the modern Amazon River and that transect the entire near-equatorial Amazon region of Brazil, from the Andean foreland to the Atlantic Ocean. In addition, the offshore site on the Foz do Amazonas Basin, to the northwest of the Amazon Fan, was planned to obtain a nearly complete sedimentary sequence spanning the Eocene through modern. The proposals were submitted to the International Continental Drilling Program (ICDP) and to the International Ocean Discovery Program (IODP). The transect of sites is essential for distinguishing basin-wide and continental-scale patterns of climate, landscape, and biotic evolution; evaluating questions about west-to-east gradients and hydrologic connectivity; and correlating the continental strata with the offshore site dated using marine biostratigraphy. In addition, in the Amazonas Basin, we propose to drill both the Cenozoic sedimentary sequence and the entire 1100 m thick underlying diabase sequence along with its interbedded host meta-sediments. This transect will span 40^{o}W to 73^{o}W, thus encircling nearly 10% of Earth's equatorial circumference. We believe that this work will provide transformative understanding of Amazonian geological, oceanographic, climatic and biotic evolution that addresses important and long-standing questions about the linkages between the geophysical environment and its biotic history.

KEY WORDS: Biodiversity, Paleoclimate, Paleoceanography