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### **CRYSTALLIZATION HISTORY AND TECTONIC SETTING OF DIKES AND SILL COMPLEXES IN THE EQUATORIAL ATLANTIC MAGMATIC PROVINCE: EVIDENCE FOR AN INTERCONNECTED PLUMBING SYSTEM**

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Early Cretaceous mafic dikes and sills intrude the Precambrian rocks of the Borborema Province and the Paleozoic deposits of the Parnaíba Basin in NE Brazil. The giant Rio Ceará-Mirim dike swarm of approximately 1,000 km in length shows an arcuate geometry formed by sets of dikes ranging from E-W to NE-SW directions. The second main set of dikes extends for 380 km in the WNW-direction to join the Rio Ceará-Mirim dikes close to the Potiguar rift. We investigated the tectonic setting of the mafic magmatism through the crystallization history based on plagioclase crystal size distribution (CSD) and on the dike structural trends to shed light on the connection between the dikes and sills. Plagioclase compositions show normal crystallization trends with the magma becoming more evolved towards the final stages of crystallization. CSD data indicate that residence times between dikes and sills are generally similar, although some dikes display higher residence times in agreement with a longer crystallization history. These results suggest a deeper crystallization setting for the dikes in agreement with a plumbing system in that dikes penetrate the “stiffer” basement units to feed upward the sills accommodated between sedimentary layers with contrasted rheologies. The regional distribution of the mafic magmatism resulted from a bulk NW-trending extensional deformation, where the reactivation of both fracture sets and pre-existing crustal weakness zones allowed the nucleation of the arcuate dike system.

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