

MAPPING THE CENTRAL ATLANTIC MAGMATIC PROVINCE

J. Gregory McHone, GLSP, Wesleyan University, Middletown, CT 06459-0519

Mesozoic basins that preserve extrusive basalts of the 200-Ma Central Atlantic Magmatic Province (CAMP) total about 300,000 km². However, dikes and sills of CAMP that fed the basin basalts also occur across 11 million km² within four continents, centered upon but extending far outside of the initial Pangaeian rift zone. New maps show CAMP dikes, sills, and surface lavas, with evidence that the province includes regions between Texas and Venezuela along its western side. The N-S dimension of CAMP is greater than 5,000 km, with several dikes greater than 500 km long, sills exceeding 100,000 km³, and lava flows larger than 50,000 km². In addition, basalts of the East Coast margin igneous province (ECMIP) of North America, which cause the East Coast Magnetic Anomaly, covered about 60,000 km² with perhaps 1.3 million km³ of extrusive lavas. If only half of the continental CAMP area was originally covered by 200 m of lava, the total volume of CAMP and ECMIP extrusive basalt exceeded 2.4 million km³ and may be Earth's largest subaerial flood basalt event. A similar amount remains frozen in the uppermost crust.

The distribution of chemical groups within the province is pertinent to geodynamic and petrologic models for the origin of this and other large flood basalt provinces. Radiometric and stratigraphic ages indicate most of the magmatic activity was everywhere brief and close to the Tr-J boundary, which is marked by a profound mass extinction. Huge emissions of CAMP volcanic gases would have caused major world-wide environmental problems. Proving a connection between CAMP volatiles and the mass extinction will depend on how precisely new radiometric dates for the basalts bracket the Tr-J boundary.