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Nitrogen Fixation in the Eastern Equatorial Atlantic: Who and How Much?

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The Eastern Equatorial Atlantic is a physically dynamic and complex region that is vastly understudied. The carbon and nitrogen cycles in this region is affected by seasonal coastal and equatorial upwelling as well as terrigenous inputs from the Congo, Niger, and other smaller central African rivers. We undertook two cruises in the summer of 2006 and 2007 to measure nitrogen fixation rates as well as quantify the major known diazotrophs using 15N uptake measurements, enumeration using epifluorescent microscopy, and nifH gene copies and gene transcript abundance. Trichodesmium was the most abundant diazotroph with the highest abundance in the Gulf of Guinea. Highest nitrogen fixation rates and nifH transcript abundance were measured along the central African coast and in the Congo River plume up to 500 km offshore and were as high as 20 nmol/L/hr. But our novel findings were the high abundance of the group A diazotroph and Trichodesmium resulting in high nitrogen fixation rates in the core of the Equatorial upwelling zone. We will present results of our measurements and discuss the implications to our understanding of the carbon and nitrogen cycles in the Eastern Equatorial Atlantic Ocean.