



Title Interannual variation in summer N₂O concentration in the hypoxic region of the northern Gulf of Mexico, 1985-2007

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Abstract We present evidence of temporal variation in nitrous oxide (N₂O) concentrations in the bottom waters of the northern Gulf of Mexico (nGOM) hypoxic zone. The analysis is based on a conceptual model simulating N₂O biogeochemical processes in conjunction with water-column O₂ levels, derived from summer Texas–Louisiana shelf-wide hydrographic data for twenty Julys between 1985 and 2007. The mean modeled nGOM N₂O concentration was 7.7 ± 6.7 nmol L⁻¹, and was significantly correlated with the areal extent of hypoxia. Our modeling analysis indicates that the nGOM is a persistent summer source of N₂O, and nitrification is a primary factor leading to its production in this region. Based on the ongoing increase in the areal extent of hypoxia in the nGOM, we conclude that N₂O emission from this environmentally stressed region will continue to increase into the future contributing to the global increase in greenhouse gases.