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Nitrous oxide emissions from the Arabian Sea: A synthesis

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Abstract. We computed high-resolution (1° latitude x 1° longitude) seasonal and annual nitrous oxide (N₂O) concentration fields for the Arabian Sea surface layer using a database containing more than 2400 values measured between December 1977 and July 1997. N₂O concentrations are highest during the southwest (SW) monsoon along the southern Indian continental shelf. Annual emissions range from 0.33 to 0.70 Tg N₂O and are dominated by fluxes from coastal regions during the SW and northeast monsoons. Our revised estimate for the annual N₂O flux from the Arabian Sea is much more tightly constrained than the previous consensus derived using averaged in-situ data from a smaller number of studies. However, the tendency to focus on measurements in locally restricted features in combination with insufficient seasonal data coverage leads to considerable uncertainties of the concentration fields and thus in the flux estimates, especially in the coastal zones of the northern and eastern Arabian Sea. The overall mean relative error of the annual N₂O emissions from the Arabian Sea was estimated to be at least 65%.

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