Nitrous Oxide

ESSENTIAL CLIMATE VARIABLE (ECV)
FACTSHEET

GLOBAL CLIMATE OBSERVING SYSTEM
KEEPING WATCH OVER OUR CLIMATE

Nitrous oxide (N₂O) is an important climate-relevant trace gas in the Earth's atmosphere. In the troposphere it acts as a strong greenhouse gas and in the stratosphere it acts as an ozone depleting substance because it is the precursor of ozone depleting nitric oxide radicals. The ocean - including its coastal areas such as continental shelves, estuaries and upwelling areas - contribute about 30% to the atmospheric N₂O budget.

ECV Product

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>DEFINITION</th>
<th>FREQUENCY</th>
<th>RESOLUTION</th>
<th>REQUIREMENTS</th>
<th>STABILITY</th>
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<tr>
<td>INTERIOR OCEAN N₂O</td>
<td>Concentration of N₂O gas in the water column [nmol kg⁻¹]</td>
<td>Annual to decadal</td>
<td>Every 20°</td>
<td>discrete samples: ±5%;</td>
<td>Not specified</td>
<td>See EOV Specification Sheets: <a href="http://www.goosocean.org/eov">www.goosocean.org/eov</a></td>
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<tr>
<td>N₂O AIR-SEA FLUX</td>
<td>Amount of N₂O per area per year [μmol m⁻² yr⁻¹]</td>
<td>Annual to decadal</td>
<td>Every 20°</td>
<td>cont. sampling: ≤1%;</td>
<td>Not specified</td>
<td><a href="http://www.goosocean.org/eov">www.goosocean.org/eov</a></td>
</tr>
</tbody>
</table>

Data Sources

- MarinE MethanE and NiTrous Oxide (MEMENTO) database
  https://memento.geomar.de

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1 Current Products and Requirements as in the Implementation Plan 2016 (GCOS-200). GCOS is reviewing and will update the requirements until 2022. More information on: gcos.wmo.int and climatedata.wmo.int.

2 This list provides sources for openly accessible data sets with worldwide coverage for which metadata is available. It is curated by the respective GCOS ECV Steward(s). The list does not claim to be complete. Anyone with a suitable dataset who would like it to be added to this list should contact GCOS.
Figure: Global N2O (nmol kg⁻¹) distribution in 200 m depth estimated using depth/AOUR-depending N2O production rates (a) and using temperature/AOUR-depending N2O production rates (AOUR = apparent oxygen utilization rate) (b). (a,b) White areas in the Arabian Sea represent concentrations exceeding 40 nmol kg⁻¹. Annual N2O production (μmol m⁻² yr⁻¹) via nitrification integrated over the water column estimated using (c) depth/AOUR relationship and (d) temperature/AOUR relationship.