**IAP/CAS (Institute of Atmospheric Physics, Chinese Academy of Sciences) Ocean Dissolved Oxygen Profile Dataset**

**Format Description (monthly\_netCDF)**

IAP/CAS (Institute of Atmospheric Physics, Chinese Academy of Sciences) provides quality-controlled and bias-corrected ocean dissolved oxygen profile data. This dataset includes in situ ocean oxygen profile data from 3 major instruments: OSD, CTD, and Argo. OSD instrumentation is represented by bottle casts with oxygen determined by the Winkler method. CTD profiles are obtained mainly through the electrochemical sensors, whereas Argo float profiles contain data mainly obtained by optodes. The total number of profiles from all three platforms exceeds 1.2 million from 1920 to 2022.

The quality-controlled (QC) was implemented by IAP-QC, which included 9 different QC checks to identify different kinds of erroneous data and/or outliers. We used Gourteski et al., (2024) oxygen correction scheme to correct the remaining systematic bias in the Argo data. Applying the new QC procedure and bias adjustment resulted in a new global ocean oxygen dataset from 1920 to 2023 with consistent data quality across bottle samples, CTD casts, and Argo floats.

This README provides the information for the monthly netCDF files (from January 1940 to August 2023) for ocean dissolved oxygen *in-situ* profile observations. However, it should be noted that due to the data gap, some monthly files are missed.

The original data source is (i) WOD (World Ocean Database) for bottle and CTD data and (ii) GDAC (Global Data Assemble Center) for Argo data. As the metadata format and definition are different for these two sources, the IAP/CAS dissoved oxygen dataset is split into two groups:

1. **Group 1:** OSD and CTD profiles originated from WOD (DIRECTORY path: <http://www.ocean.iap.ac.cn/ftp/cheng/IAP_oxygen_profile_dataset/IAP_Oxygen_OSDCTD_netCDF_202404/>)
2. **Group 2:** Argo (PFL) profiles originated from GDAC (DIRECTORY path: <http://www.ocean.iap.ac.cn/ftp/cheng/IAP_oxygen_profile_dataset/IAP_Oxygen_Argo_netCDF_202404/>)

**VARIABLES**

* **Variables in Group 1 and in Group 2 are not the same**. For more information, please check the ‘long\_name’ or ‘standard name’ in each netCDF file.

**NOTES:**

**[1] We strongly recommended using the variables <** **DOXY\_QCed\_interpolated\_Adjusted\_IAP> and <** **Depth\_QCed\_interpolated\_Adjusted\_IAP>,** which has applied a new quality control method (IAP-QC) and the oxygen adjustment scheme developed by IAP (Gourteski et al., 2024) based on the <DOXY\_ADJUSTED> and <PRES\_ADJUSTED> provided by GDAC. Also, the data has been interpolated into 10m depth intervals. The rest of the observational variables are raw or not-fully-processed data.

**[2]** For a detailed description of each variable (such as unit, dimension, default value definition, long\_name, etc.), see the variable description in the netCDF file.

**DATA CITATIONS:**

[1] Viktor Gourteski, Lijing Cheng, Juan Du, Xiaogang Xing, Fei Chai, Zhetao Tan. 2024. A consistent ocean oxygen profile dataset with new quality control and bias assessment. *Earth System Science Data Discussions*, 2024, 2024: 1-27.

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**14/04/2024**