Chl-a data from Glob-Colour, Adjusted for the West Antarctic Peninsula

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Short Description:

Satellite Chl-a from CMEMS GlobColour Level-4 gap filled, corrected using 4th-order polynomial to match field data (Dierssen and Smith 2000). Dataset name: “dataset-oc-glo-bio-multi-l4-chl\_interpolated\_4km\_daily.” Website: <https://data.marine.copernicus.eu/product/OCEANCOLOUR_GLO_BGC_L4_MY_009_104/services>

Long Description:

Satellite-derived Chl-a data was sourced from CMEMS GlobColour (Garnesson et al. 2019). This product is a merged multi-sensor dataset using Chl-a data from SeaWiFS (1997-2010), MODIS-Terra (2000-present), MODIS-Aqua (2002-present), MERIS (2002-2012), VIIRS-NPP (2012-present), VIIRS-NOAA20 (2018-present), OLCI-S3A (2016-present) and OLCI-S3B (2018-present), processed to a common spatial resolution of 4 km. Chl-a from this record is a daily interpolated gap-filled Level-4 data product, flagged and processed as in Garnesson et al. (2019). The Chl-a algorithm in this dataset is a global algorithm based on the tendency of phytoplankton to absorb comparatively more blue light relative to green (Gohin et al. 2002, Hu et al. 2012, Garnesson et al. 2019). Merging of data from multiple sensors created some inconsistencies in the time series due to the addition of higher spatial resolution sensors such as MERIS and OLCI in later years (Van Oostende et al., 2022). However, most of those inconsistencies occur in very nearshore waters. This dataset is suitable for our analysis thanks to the broad spatial coverage of the ecoregions in this study, including mostly offshore waters not impacted by the addition of higher spatial resolution sensors.

Global Chl-a algorithms are known to underestimate Chl-a in the WAP region by a factor of 2 to 2.5 (Mitchell & Holm-Hansen 1991, Mitchell 1992, Dierssen 2000, Dierssen & Smith 2000, Kahru & Mitchell 2010, IOCCG 2015). To correct for the underestimation by global algorithms, we applied a 4th-order polynomial to the global Chl-a dataset to match field data (Dierssen and Smith 2000). As shown in Fig. S3 and Fig. S4 in the Supplement, this correction is minimal at low Chl-a concentrations representative of offshore waters of the SPF, where the standard algorithms generally perform well (Dierssen 2000, Haëntjens et al. 2017). These corrections are conducted to better reflect the range in Chl-a from shelf to open ocean in the WAP region. Because the correction is consistent throughout the satellite time series, it does not impact the analyses of Chl-a phenology over time.

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