

Data Repository for:  
**Decadal sea level variability in the Australasian Mediterranean Sea**  
Patrick Wagner and Claus W. Böning

If you have any further questions regarding this data or the simulations used in the study, or want to have access to more datasets, please contact [fb1-od-data@geomar.de](mailto:fb1-od-data@geomar.de)

Whenever using this data, please cite:  
Wagner, P. and Böning, C. W.: Decadal sea-level variability in the Australasian Mediterranean Sea, *Ocean Sci.*, 17, 1473–1487, <https://doi.org/10.5194/os-17-1473-2021>, 2021.

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Data needed to reproduce the figures in the study can be found in this repository. All files are in netCDF4 format. For each figure, there is a directory, that contains all data needed to plot it. Note that we do not include any third party data in this repository.

The altimetry observations shown in Figure 2 are provided by E.U. Copernicus Marine Service (CMEMS).  
[https://resources.marine.copernicus.eu/?option=com\\_csw&view=details&product\\_id=SEALEVEL\\_GLO\\_PHY\\_L4\\_REP\\_OBSERVATIONS\\_008\\_047](https://resources.marine.copernicus.eu/?option=com_csw&view=details&product_id=SEALEVEL_GLO_PHY_L4_REP_OBSERVATIONS_008_047)

The hydrographic data shown in Figure 3 are provided by NOAA National Centers for Environmental Information. Temperature:

Locarnini, R. A., A. V. Mishonov, O. K. Baranova, T. P. Boyer, M. M. Zweng, H. E. Garcia, J. R. Reagan, D. Seidov, K. Weathers, C. R. Paver, and I. Smolyar, 2018. *World Ocean Atlas 2018, Volume 1: Temperature*. A. Mishonov Technical Ed.; NOAA Atlas NESDIS 81, 52pp

Salinity:  
Zweng, M. M., J. R. Reagan, D. Seidov, T. P. Boyer, R. A. Locarnini, H. E. Garcia, A. V. Mishonov, O. K. Baranova, K. Weathers, C. R. Paver, and I. Smolyar, 2018. *World Ocean Atlas 2018, Volume 2: Salinity*. A. Mishonov Technical Ed.; NOAA Atlas NESDIS 82, 50pp.

The observational data shown in Figure A1 are provided by NOAA PSL and Nate Mantua:  
Nino3.4:  
[https://psl.noaa.gov/gcos\\_wgsp/Timeseries/Data/nino34.long.data](https://psl.noaa.gov/gcos_wgsp/Timeseries/Data/nino34.long.data), last access: 07 Jun 2017  
PDO:  
<http://research.jisao.washington.edu/pdo/PDO.latest>, last access: 08 Jun 2017

A jupyter-notebook to produce all plots from provided data is also included.

If you have any questions concerning the simulations, please refer to them by their original names as listed below:

**REF025 = ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast**  
**REF005 = NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast**  
**BUOY = ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K004.thermhl90**  
**WIND = ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K005.wind90**  
**CLIM = ORCA025.L46.LIM2vp.JRA.XIOS2.RAF-KPW001**

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A detailed list of files together with a description of the contents is given below.

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**FIGURE01**  
**schematic.png**  
A high-resolution version of the schematic shown as figure 1.

**FIGURE02**  
**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_sossheig\_standard\_deviation.nc**  
Standard deviation of SSH (m), based on yearly averages from REF005. Linear trend removed.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_5d\_19580101\_20181231\_grid\_T\_sossheig\_archipel.nc**  
SSH anomalies (m) from REF005 averaged over the Australasian Mediterranean Sea region. Linear trend removed. Data is filtered with a 12-month boxcar window.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_lsmask.nc**  
Binary land-sea mask at the sea surface for REF005 model output.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_archipel\_mask.nc**  
Binary mask marking the region of the Australasian Mediterranean Sea for REF005 model output.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_sossheig\_standard\_deviation.nc**  
Standard deviation of SSH (m), based on yearly averages from REF025. Linear trend removed.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_1m\_19580101\_20161231\_grid\_T\_sossheig\_archipel.nc**  
SSH anomalies (m) from REF005 averaged over the Australasian Mediterranean Sea region. Linear trend removed.

Data is filtered with a 12-month boxcar window.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_mbathy.nc**  
Ocean depth of REF005.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_lsmask.nc**  
Binary land-sea mask at the sea surface for REF025 model output.

#### FIGURE03

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_WOA18grid\_votemper\_bias.nc**  
Upper ocean (0-400 m) temperature bias (K) of REF005 relative to WOA18-data.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_WOA18grid\_vosaline\_bias.nc**  
Upper ocean (0-400 m) salinity bias (K) of REF005 relative to WOA18-data.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_WOA18grid\_votemper\_bias.nc**  
Upper ocean (0-400 m) temperature bias (K) of REF025 relative to WOA18-data.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_WOA18grid\_vosaline\_bias.nc**  
Upper ocean (0-400 m) salinity bias (K) of REF025 relative to WOA18-data.

#### FIGURE04

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_sossheig\_standard\_deviation.nc**  
Standard deviation of SSH (m), based on yearly averages from REF005. Linear trend removed and 8-yr lowpass filter applied.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_5d\_19580101\_20181231\_grid\_T\_sossheig\_archipel.nc**  
SSH anomalies (m) from REF005 averaged over the Australasian Mediterranean Sea region. Linear trend removed and 8-yr lowpass filter applied.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_lsmask.nc**  
Binary land-sea mask at the sea surface for REF005 model output.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_sossheig\_standard\_deviation.nc**  
Standard deviation of SSH (m), based on yearly averages from REF025. Linear trend removed and 8-yr lowpass filter applied.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_1m\_19580101\_20161231\_grid\_T\_sossheig\_archipel.nc**  
SSH anomalies (m) from REF025 averaged over the Australasian Mediterranean Sea region. Linear trend removed and 8-yr lowpass filter applied.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_archipel\_mask.nc**

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_lsmask.nc**  
Binary land-sea mask at the sea surface for REF005, BUOY, WIND and CLIM model output.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K004.thermhal90\_grid\_T\_sossheig\_standard\_deviation.nc**  
Standard deviation of SSH (m), based on yearly averages from BUOY. Linear trend removed and 8-yr lowpass filter applied.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K004.thermhal90\_1m\_19580101\_20161231\_grid\_T\_sossheig\_archipel.nc**  
SSH anomalies (m) from BUOY averaged over the Australasian Mediterranean Sea region. Linear trend removed and 8-yr lowpass filter applied.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K005.wind90\_grid\_T\_sossheig\_standard\_deviation.nc**  
Standard deviation of SSH (m), based on yearly averages from WIND. Linear trend removed and 8-yr lowpass filter applied.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K005.wind90\_1m\_19580101\_20161231\_grid\_T\_sossheig\_archipel.nc**  
SSH anomalies (m) from WIND averaged over the Australasian Mediterranean Sea region. Linear trend removed and 8-yr lowpass filter applied.

**ORCA025.L46.LIM2vp.JRA.XIOS2.RAF-KPW001\_grid\_T\_sossheig\_standard\_deviation.nc**  
Standard deviation of SSH (m), based on yearly averages from CLIM. Linear trend removed and 8-yr lowpass filter applied.

**ORCA025.L46.LIM2vp.JRA.XIOS2.RAF-KPW001\_1m\_19580101\_20161231\_grid\_T\_sossheig\_archipel.nc**  
Binary mask marking the region of the Australasian Mediterranean Sea for REF025 model output.

#### FIGURE05

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_sossheig\_nino34.nc**  
Linear regression of lowpass filtered (8-yr) SSH (m) from REF005 on Nino34 index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_sossheig\_pdo.nc**  
Linear regression of lowpass filtered (8-yr) SSH (m) from REF005 on PDO index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_lsmask.nc**

Binary land-sea mask at the sea surface for REF005 model output.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_sossheig\_nino34.nc**

Linear regression of lowpass filtered (8-yr) SSH (m) from REF025 on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_sossheig\_pdo.nc**

Linear regression of lowpass filtered (8-yr) SSH (m) from REF025 on PDO index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_lsmask.nc**

Binary land-sea mask at the sea surface for REF025 and CLIM model output.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K004.thermhal90\_grid\_T\_sossheig\_nino34.nc**

Linear regression of lowpass filtered (8-yr) SSH (m) from BUOY on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K004.thermhal90\_grid\_T\_sossheig\_pdo.nc**

Linear regression of lowpass filtered (8-yr) SSH (m) from BUOY on PDO index.

#### FIGURE06

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_sossheig\_nino34.nc**

Factor of explained variance ( $R^2$ ) of linear regression of lowpass filtered (8-yr) SSH (m) from REF005 on Nino34 index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_sossheig\_pdo.nc**

Factor of explained variance ( $R^2$ ) of linear regression of lowpass filtered (8-yr) SSH (m) from REF005 on PDO index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_lsmask.nc**

Binary land-sea mask at the sea surface for REF005 model output.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_sossheig\_nino34.nc**

Factor of explained variance ( $R^2$ ) of linear regression of lowpass filtered (8-yr) SSH (m) from REF025 on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_sossheig\_pdo.nc**

Factor of explained variance ( $R^2$ ) of linear regression of lowpass filtered (8-yr) SSH (m) from REF025 on PDO index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_lsmask.nc**

Binary land-sea mask at the sea surface for REF025 and BUOY model output.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K004.thermhal90\_grid\_T\_sossheig\_nino34.nc**

Factor of explained variance ( $R^2$ ) of linear regression of lowpass filtered (8-yr) SSH (m) from BUOY on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K004.thermhal90\_grid\_T\_sossheig\_pdo.nc**

Factor of explained variance ( $R^2$ ) of linear regression of lowpass filtered (8-yr) SSH (m) from BUOY on PDO index.

#### FIGURE07

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_sossheig\_nino34.nc**

Linear regression of lowpass filtered (8-yr) SSH (m) from REF005 on Nino34 index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_sossheig\_pdo.nc**

Linear regression of lowpass filtered (8-yr) SSH (m) from REF005 on PDO index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_ssh\_halosteric\_nino34.nc**

Linear regression of lowpass filtered (8-yr) halosteric SSH (m) from REF005 on Nino34 index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_ssh\_halosteric\_pdo.nc**

Linear regression of lowpass filtered (8-yr) halosteric SSH (m) from REF005 on PDO index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_ssh\_thermosteric\_nino34.nc**

Linear regression of lowpass filtered (8-yr) thermosteric SSH (m) from REF005 on Nino34 index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_ssh\_thermosteric\_pdo.nc**

Linear regression of lowpass filtered (8-yr) halposteric SSH (m) from REF005 on Nino34 index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_U\_zonal\_current\_nino34.nc**

Linear regression of lowpass filtered (8-yr) zonal currents (m/s), averaged over the upper ocean (0-150 m), from REF005 on Nino34 index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_U\_zonal\_current\_pdo.nc**

Linear regression of lowpass filtered (8-yr) zonal currents (m/s), averaged over the upper ocean (0-150 m), from REF005 on PDO index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_V\_meridional\_current\_nino34.nc**

Linear regression of lowpass filtered (8-yr) meridional currents (m/s), averaged over the upper ocean (0-150 m), from REF005 on Nino34 index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_V\_meridional\_current\_pdo.nc**

Linear regression of lowpass filtered (8-yr) meridional currents (m/s), averaged over the upper ocean (0-150 m), from REF005 on PDO index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_grid\_T\_lsmask.nc**

Binary land-sea mask at the sea surface for REF005 model output.

**FIGURE08**

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_vosaline\_banda\_nino34.nc**

Linear regression of lowpass filtered (8-yr) salinity (psu) from REF005 averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on Nino34 index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_vosaline\_banda\_pdo.nc**

Linear regression of lowpass filtered (8-yr) salinity (psu) from REF005 averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on PDO index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_votemper\_banda\_nino34.nc**

Linear regression of lowpass filtered (8-yr) temperature (°C) from REF005 averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on Nino34 index.

**1\_NUSA20.L46.LIM2vp.JRA.XIOS2-KPW002.hindcast\_votemper\_banda\_pdo.nc**

Linear regression of lowpass filtered (8-yr) temperature (°C) from REF005 averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on PDO index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_vosaline\_banda\_nino34.nc**

Linear regression of lowpass filtered (8-yr) salinity (psu) from REF025 averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_vosaline\_banda\_pdo.nc**

Linear regression of lowpass filtered (8-yr) salinity (psu) from REF025 averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on PDO index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_votemper\_banda\_nino34.nc**

Linear regression of lowpass filtered (8-yr) temperature (°C) from REF025 averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_votemper\_banda\_pdo.nc**

Linear regression of lowpass filtered (8-yr) temperature (°C) from REF025 averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on PDO index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K004.thermhal90\_vosaline\_banda\_nino34.nc**

Linear regression of lowpass filtered (8-yr) salinity (psu) from BUOY averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K004.thermhal90\_vosaline\_banda\_pdo.nc**

Linear regression of lowpass filtered (8-yr) salinity (psu) from BUOY averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on PDO index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K004.thermhal90\_votemper\_banda\_nino34.nc**

Linear regression of lowpass filtered (8-yr) temperature (°C) from BUOY averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K004.thermhal90\_votemper\_banda\_pdo.nc**

Linear regression of lowpass filtered (8-yr) temperature (°C) from BUOY averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on PDO index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K005.wind90\_vosaline\_banda\_nino34.nc**

Linear regression of lowpass filtered (8-yr) salinity (psu) from WIND averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K005.wind90\_vosaline\_banda\_pdo.nc**

Linear regression of lowpass filtered (8-yr) salinity (psu) from WIND averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on PDO index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K005.wind90\_votemper\_banda\_nino34.nc**

Linear regression of lowpass filtered (8-yr) temperature (°C) from WIND averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K005.wind90\_votemper\_banda\_pdo.nc**

Linear regression of lowpass filtered (8-yr) temperature (°C) from WIND averaged over a region in the Banda Sea (7°S - 3°S; 125°E - 133°E) on PDO index.

**FIGUREA2**

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_1m\_19580101\_20161231\_nino34.nc**

Nino34 index based on REF025.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_1m\_19580101\_20161231\_pdo.nc**

PDO index based on REF025.

**FIGUREA2**

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K005.wind90\_grid\_T\_sossheig\_nino34.nc**

Linear regression of lowpass filtered (8-yr) SSH (m) from WIND on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K005.wind90\_grid\_T\_sossheig\_pdo.nc**

Linear regression of lowpass filtered (8-yr) SSH (m) from WIND on PDO index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K005.wind90\_grid\_T\_sossheig\_pdo\_r2.nc**

Factor of explained variance ( $R^2$ ) of linear regression of lowpass filtered (8-yr) SSH (m) from WIND on PDO index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K005.wind90\_grid\_T\_sossheig\_nino34\_r2.nc**

Factor of explained variance ( $R^2$ ) of linear regression of lowpass filtered (8-yr) SSH (m) from WIND on Nino34 index.

**ORCA025.L46.LIM2vp.CFCSF6.JRA.XIOS2-K003.hindcast\_grid\_T\_lsmask.nc**

Binary land-sea mask at the sea surface for WIND model output.