Antarctic sea-ice freshwater fluxes associated with freezing, transport, and melting (AnIceFlux)

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ETH Zürich, September 2016

About AnIceFlux:

This data set provides estimates of annual freshwater fluxes related to sea-ice formation from ocean freezing and snow-ice formation, sea-ice melting, lateral transport of sea ice in the Southern Ocean over the period 1982 to 2008. It is derived from a mass balance calculation of local sea-ice volume change and divergence from satellite data and sea-ice reconstructions. The mass balance is calculated on a daily basis and fluxes are then integrated over the entire year, where a year is defined from March to February of the next year (i.e. from March 1982 to February 2009). This approach combines multiple products of sea-ice concentration (Cavalieri & Parkinson, 2008; Comiso, 1986; Meier et al., 2013), sea-ice thickness (Kurtz & Markus, 2012; Massonnet et al., 2013; Worby et al., 2008), and sea-ice drift (Fowler et al., 2013; Kwok 2005; Schwegmann et al., 2011). For a detailed description of the method see Haumann et al. (2016). The data set is derived to estimate large-scale (regional to basin-scale) fluxes on an annual basis. Our confidence is reduced on a grid cell basis, such as for single coastal polynyas, where the method and underlying data induce large, unknown uncertainties.

In a publication please cite:
Haumann, F. A., Gruber, N., Münnich, M., Frenger, I., Kern S. (2016): Sea-ice transport driving Southern Ocean salinity and its recent trends. Nature 537, 89–92 doi:10.1038/nature19101.

Data set citation:
Haumann, F. A., Gruber, N., Münnich, M., Frenger, I., Kern, S. (2016): Antarctic sea-ice freshwater fluxes associated with freezing, transport, and melting. ETH Zurich. doi:10.16904/8.

Please contact us if you have any questions or comments regarding the data set or if you need data in another format or resolution. We would also appreciate a copy of any publication that results from using this data.

Available online:	http://dx.doi.org/10.16904/8
FTP access:	ftp://data.up.ethz.ch/AnIceFlux
Contact:	alexander.haumann@usys.ethz.ch
Data format:	NetCDF4 CF-1.6
Version:	Version 1
Spatial resolution:	75 × 75 km (107 × 107 grid points)
Spatial coverage:	N:-37.0°, S:-89.7°, E: 180°, W: -180°
Temporal resolution:	Annual and/or climatological mean
Temporal coverage:	March 1982 – February 2009
Data gaps:	1987, 1989, 1990, 1991, 2005, 2006
Variables:	Net ice-ocean freshwater flux [m yr^{-1}] Net ice-ocean freshwater flux due to sea-ice divergence [m yr^{-1}] Ice-ocean freshwater flux due to sea-ice melting [m yr^{-1}] Freshwater flux due to ocean freezing and snow-ice formation [m yr^{-1}] Eastward sea-ice freshwater transport [m^2 s^{-1}] Northward sea-ice freshwater transport [m^2 s^{-1}]
Sign convention:	Positive = Freshwater flux from sea ice to ocean, north- or eastward Negative = Freshwater flux from ocean or snow to sea ice, south- or westward

Files:

AnIceFlux_v01_annual_1982-2008.nc:
Content: Annual fluxes over the period 1982 to 2008
File size: 1.5 MB
Precision: Single floating-point (32 bits)
Missing values: -9.99e+20

Variables:	Units:	Descriptions:
lon	[degrees east]	Longitude. Range: 0 to 360
lat	[degrees north]	Latitude. Range: -37.0 to -89.7
time	[days since 1979-01-01 00:00:00]	Time in days centered at the mean between 1st March of the corresponding year and 28th / 29th February of the next year, which is the time period over which variables are averaged or integrated. Range: 1337 (30th August, 1982) to 10,834 (30th August, 2008)
mask	[-]	Land-sea mask. Range: 0 (land) to 1 (sea)
zero_line	[-]	Smoothed, climatological zero ice-ocean freshwater flux line (see Haumann et al., 2016 for details). Range: -1 (net flux to sea ice) to 1 (net flux to ocean)
cell_area	[m^2]	Area of grid cell. Range: 5.6782e+9 to 5.7921e+9
net_ioflux	[m yr^{-1}]	Net annual ice-ocean freshwater flux.
net_ioflux_div	[m yr^{-1}]	Net ice-ocean freshwater flux due to sea-ice divergence.
u_flux	[m^2 s^{-1}]	Eastward sea-ice freshwater transport.
v_flux	[m^2 s^{-1}]	Northward sea-ice freshwater transport.

AnIceFlux_v01_clim_mean_1982-2008.nc:
Content: Climatological mean of annual fluxes over the period 1982 to 2008
File size: 255 kB
Precision: Single floating-point (32 bits)
Missing values: -9.99e+20

Variables:	Units:	Descriptions:
lon	[degrees east]	Longitude. Range: 0 to 360
lat	[degrees north]	Latitude. Range: -37.0 to -89.7
time	[days since 1979-01-01 00:00:00]	Time in days. Range: 6085.5 (30th August, 1995)
mask	[-]	Land-sea mask. Range: 0 (land) to 1 (sea)
zero_line	[-]	Smoothed, climatological zero ice-ocean freshwater flux line (see Haumann et al., 2016 for details). Range: -1 (net flux to sea ice) to 1 (net flux to ocean)
cell_area	[m^2]	Area of grid cell. Range: 5.6782e+9 to 5.7921e+9
net_ioflux	[m yr^{-1}]	Net annual ice-ocean freshwater flux.
net_ioflux_div	[m yr^{-1}]	Net ice-ocean freshwater flux due to sea-ice divergence.
u_flux	[m^2 s^{-1}]	Eastward sea-ice freshwater transport.
v_flux	[m^2 s^{-1}]	Northward sea-ice freshwater transport.
melting	[m yr^{-1}]	Ice-ocean freshwater flux due to sea-ice melting
freezing	[m yr^{-1}]	Freshwater flux due to ocean freezing and snow-ice formation

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Keywords: Antarctic, Sea Ice, Polar, Southern Ocean, Freshwater Flux, Melting, Freezing, Transport, Salt, Salinity, Forcing, Mass Balance, Sea Ice Volume, Sea Ice Divergence, Satellite, Passive Microwave, Climate, Climate Change