ECCO Version 4 Release 2 **[https://dataverse.harvard.edu/dataverse/ECCOv4r2]** **[doi:10.7910/DVN/NXYKDW]**

- This dataset (http://dx.doi.org/10.7910/DVN/NXYKDW) provides the monthly 1992-2011 time series of the 'ECCO version 4, release 2' ocean state estimate (Forget et al. 2015, 2016) for the following variables:

ADVeHEFF : "Eastward Advective Flux of eff ice thickn"
ADVe_SLT : "Eastward Advective Flux of Salinity"
ADVeSNOW : "Eastward Advective Flux of eff snow thickn"
ADVe_TH : "Eastward Advective Flux of Pot.Temperature"
ADVnHEFF : "Northward Advective Flux of eff ice thickn"
ADVn_SLT : "Northward Advective Flux of Salinity"
ADVnSNOW : "Northward Advective Flux of eff snow thickn"
ADVn_TH : "Northward Advective Flux of Pot.Temperature"
ADVr_SLT : "Vertical Advective Flux of Salinity"
ADVr_TH : "Vertical Advective Flux of Pot.Temperature"
ADVxHEFF : "U Comp. Advective Flux of eff ice thickn"
ADVx_SLT : "U Comp. Advective Flux of Salinity"
ADVxSNOW : "U Comp. Advective Flux of eff snow thickn"
ADVx_TH : "U Comp. Advective Flux of Pot.Temperature"
ADVyHEFF : "V Comp. Advective Flux of eff ice thickn"
ADVy_SLT : "V Comp. Advective Flux of Salinity"
ADVySNOW : "V Comp. Advective Flux of eff snow thickn"
ADVy_TH : "V Comp. Advective Flux of Pot.Temperature"
DFeEHEFF : "Eastward Diffusive Flux of eff ice thickn"
DFeE_SLT : "Eastward Diffusive Flux of Salinity"
DFeESNOW : "Eastward Diffusive Flux of eff snow thickn"
DFeE_TH : "Eastward Diffusive Flux of Pot.Temperature"
DFnEHEFF : "Northward Diffusive Flux of eff ice thickn"
DFnE_SLT : "Northward Diffusive Flux of Salinity"
DFnESNOW : "Northward Diffusive Flux of eff snow thickn"
DFnE_TH : "Northward Diffusive Flux of Pot.Temperature"
DFrE_SLT : "Vertical Diffusive Flux of Salinity (Explicit part)"
DFrE_TH : "Vertical Diffusive Flux of Pot.Temperature (Explicit part)"
DFrI_SLT : "Vertical Diffusive Flux of Salinity (Implicit part)"
DFrI_TH : "Vertical Diffusive Flux of Pot.Temperature (Implicit part)"

DFxEHEFF : "U Comp. Diffusive Flux of eff ice thickn"
DFxE_SLT : "U Comp. Diffusive Flux of Salinity"
DFxESNOW : "U Comp. Diffusive Flux of eff snow thickn"
DFxE_TH : "U Comp. Diffusive Flux of Pot.Temperature"
DFyEHEFF : "V Comp. Diffusive Flux of eff ice thickn"
DFyE_SLT : "V Comp. Diffusive Flux of Salinity"
DFyESNOW : "V Comp. Diffusive Flux of eff snow thickn"
DFyE_TH : "V Comp. Diffusive Flux of Pot.Temperature"
DRHODR : "Stratification: d.Sigma/dr (kg/m3/r_unit)"
ETAN : "Free Surface Height Anomaly (Ocean-Ice Interface)"
EVELMASS : "Eastward Mass-Weighted Comp of Velocity (m/s)"
EVELSTAR : "Eastward Comp of Bolus Velocity (m/s)"
GM_PsiX : "GM Bolus transport stream-function : U component"
GM_PsiY : "GM Bolus transport stream-function : V component"
MXLDEPTH : "Mixed-Layer Depth (>0)"
NVELMASS : "Northward Mass-Weighted Comp of Velocity (m/s)"
NVELSTAR : "Northward Comp of Bolus Velocity (m/s)"
oceFWflx : "net surface Fresh-Water flux into the ocean (+=down), >0 decreases salinity"
oceQnet : "net surface heat flux into the ocean (+=down), >0 increases theta"
oceQsw : "net Short-Wave radiation (+=down), >0 increases theta"
oceSPflx : "net surface Salt flux rejected into the ocean during freezing, (+=down),"
oceSPtnd : "salt tendency due to salt plume flux >0 increases salinity"
oceTAUE : "Eastward surface wind stress, >0 increases eVel"
oceTAUN : "Northward surface wind stress, >0 increases nVel"
oceTAUX : "U Comp. surface wind stress, >0 increases uVel"
oceTAUY : "V Comp. surface wind stress, >0 increases vVel"
PHIBOT : "Bottom Pressure Pot.(p/rho) Anomaly"
PHIHYD : "Hydrostatic Pressure Pot.(p/rho) Anomaly"
RHOAnoma : "Density Anomaly (=Rho-rhoConst)"
SALT : "Salinity"
SFLUX : "total salt flux (match salt-content variations), >0 increases salt"
SIarea : "SEAICE fractional ice-covered area [0 to 1]"
SIatmFW : "Net freshwater flux from atmosphere & land (+=down)"
SIatmQnt : "Net atmospheric heat flux, >0 decreases theta"
sIceLoad : "sea-ice loading (in Mass of ice+snow / area unit)"
SIheff : "SEAICE effective ice thickness"

SIhsnow : "SEAICE effective snow thickness"
TFLUX : "total heat flux (match heat-content variations), >0 increases theta, W/m2"
THETA : "Potential Temperature"
UVELMASS : "U Mass-Weighted Comp of Velocity (m/s)"
UVELSTAR : "U Comp of Bolus Velocity (m/s)"
VVELMASS : "V Mass-Weighted Comp of Velocity (m/s)"
VVELSTAR : "V Comp of Bolus Velocity (m/s)"
WVELMASS : "Vertical Mass-Weighted Comp of Velocity"
WVELSTAR : "Vertical Comp of Bolus Velocity (m/s)"

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- Comments:

- 'ECCO Version 4 Release 2' is a global ocean state estimate that covers the period from 1992 to 2011 (Forget et al. 2015, 2016). It was produced on behalf of the ECCO consortium (http://ecco-group.org/) with major support provided NASA's Physical Oceanography Program. General documentation of the 'ECCO Version 4 Release 2' dataverse and all included datasets can be found at https://dx.doi.org/10.7910/DVN/ODM2IQ (see README.pdf in that dataset).
- Global state estimate fields are provided on the native LLC90 grid in nctiles format (see Forget et al 2015). Each global field included in this dataset is thus distributed over 13 netcdf files that each contain one 90x90 subdomain of the LLC90 grid (see nctiles90x90.jpg @ https://dx.doi.org/10.7910/DVN/ODM2IQ for a depiction).
- Individual files can be read directly in any netcdf enabled software (http://www.unidata.ucar.edu/software/netcdf/software.html) such as http://www.giss.nasa.gov/tools/panoply/ or Matlab. Their 69°S to 56°N sector, which follows a simple `lat-lon' grid, can be extracted using eccov4_lonlat.m (https://dx.doi.org/10.7910/DVN/ODM2IQ). Global fields can also be manipulated or interpolated to any other grid using the gcmfaces toolbox (see ECCOV4R2_gcmfaces.pdf @ https://dx.doi.org/10.7910/DVN/ODM2IQ).
- The formatting, online publishing, and archiving of the ECCO V4 R2 dataverse and datasets have benefited from guidance that was graciously provided by the MIT Libraries Data Management Services (http://libraries.mit.edu/data-management/). At time of writing the contents listed above can alternatively be downloaded from ftp://mit.ecco-group.org/ecco_for_las/version_4/release2/nctiles_monthly/ and an interpolated version of the state estimate fields is available at ftp://mit.ecco-group.org/ecco_for_las/version_4/release2/interp_monthly/ on a global 1/2° regular lat-lon grid.

- References:

- Forget, G., J.-M. Campin, P. Heimbach, C. N. Hill, R. M. Ponte, and C. Wunsch, 2015: ECCO version 4: an integrated framework for non-linear inverse modeling and global ocean state estimation. Geoscientific Model Development, 8, 3071-3104, http://dx.doi.org/10.5194/gmd-8-3071-2015
- Forget, G., J.-M. Campin, P. Heimbach, C. N. Hill, R. M. Ponte, and C. Wunsch, 2016: ECCO Version 4: Second Release, http://hdl.handle.net/1721.1/102062

- Software:

- The ECCO V4 R2 files were produced using the 'checkpoint64u' versions of the general circulation model (MITgcm and ECCO v4 settings) and Matlab analysis toolboxes (gcmfaces and MITprof). These software versions are available at http://mitgcm.org/download/other_checkpoints/ and http://mit.ecco-group.org/opendap/ecco_for_las/version_4/checkpoints/contents.html
- The up to date software documentations are available at http://mitgcm.org/public/r2_manual/latest/online_documents/manual.pdf, http://mitgcm.org/viewvc/*checkout*/MITgcm/MITgcm_contrib/gael/verification/eccov4.pdf, and http://mitgcm.org/viewvc/*checkout*/MITgcm/MITgcm_contrib/gael/matlab_class/gcmfaces.pdf

- Contact Us:

- questions regarding the ECCO model set-up, grid, software, or files should be addressed to either ecco-support@mit.edu (please subscribe via http://mailman.mit.edu/mailman/listinfo/ecco-support)

or mitgcm-support@mitgcm.org more generally (please subscribe via http://mitgcm.org/mailman/listinfo/mitgcm-support).

- README file revision history:

- README file overhaul for use within dataverse [Gael Forget] [2016/08/03]