HydroCode documentation

A Fortran 95 code for calculating atmospheric stream functions

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Compiling and running

```
make
./psi.x
```

Any dataset with data on terrain-following coordinates can be used. Some models use sigma, $p_k = \sigma_k * p_s$, and some use hybrid, $p_k = a_k * p_0 + b_k * p_s$, or $p_k = a_k + b_k * p_s$.

The following data has been used

- **Reanalysis**
  - ERA-Interim
  - MERRA
- **CMIP5 models (atmosphere component only)**
  - CanESM2
  - CCSM4
  - CSIRO-Mk3-6-0
  - GFDL CM3
  - IPSL CM5A
  - NorESM1

History

Parts of the original code was written by Kristofer Doos to calculate the thermohaline stream function for the NEMO ocean model. It was then adapted for the atmosphere (ERA-Interim) by Joakim Kjellsson.

- January 2012: Original atmospheric code for ERA-Interim
- February 2013: Added OpenMP parallellisation and GRIB->netCDF conversion with CDO
- June 2013: Added options to use time-mean and/or zonal-mean variables. Also support for EC-Earth GFDL CM3.

- July 2013: Restructured code into different modules, subroutines, etc. Unified different versions.
- August 2013: Added preprocessing flags to control what stream functions are outputed.
- September 2013: Added support from CanESM2, CCSM4, IPSL-CM5A, NorESM1
- December 2013: Added support for CSIRO-Mk-3-6-0