New ECMWF operational ocean (re)analysis

Basic (existing) Setup:

- Ocean model: HOPE (~1x1 going to 1x.3 at the equator)
- Assimilation Method OI
- Assimilation of T + Balanced relationships (T-S, ρ-U)
- 10 days assimilation windows, increment spread in time
- Ensemble of 5 ocean analyses to represent uncertainty
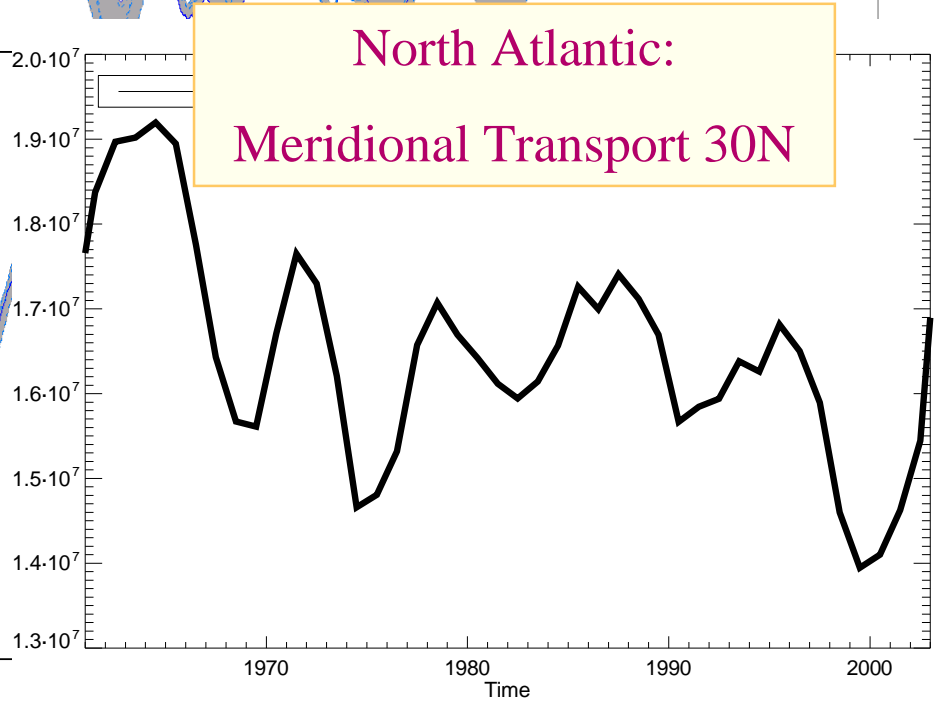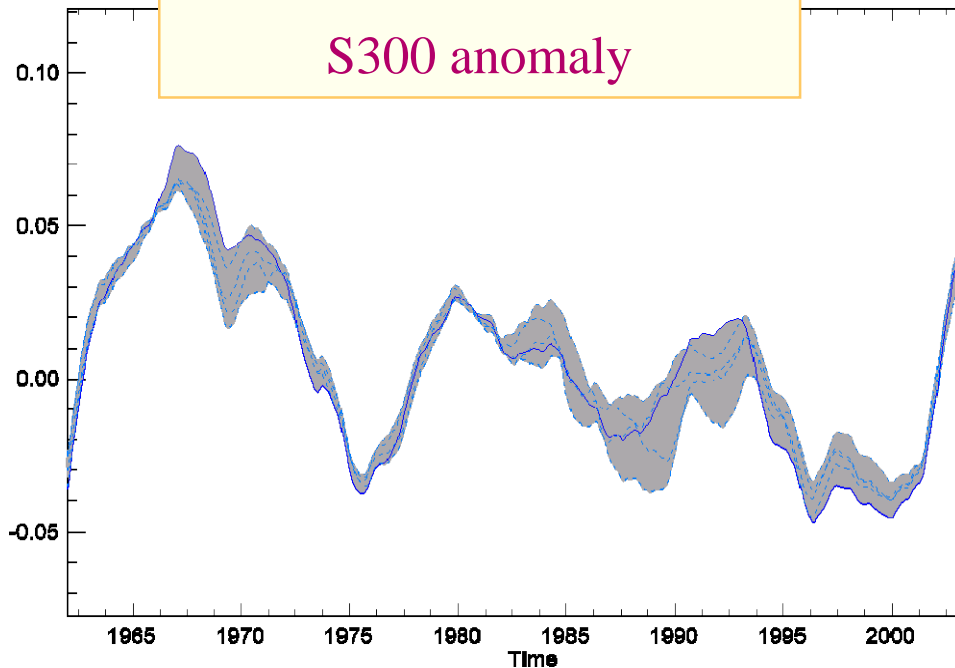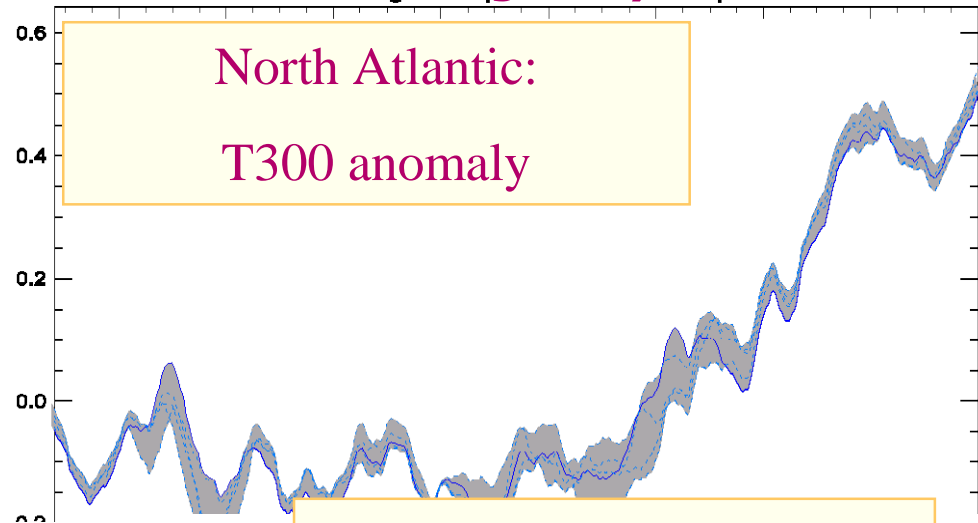
System-3

+New Features

- ERA-40 fluxes to initialize ocean

- Retrospective Ocean Reanalysis back to 1959.

- Multivariate on-line Bias Correction .

- Assimilation of salinity data.

- Assimilation of altimeter-derived sea level anomalies.
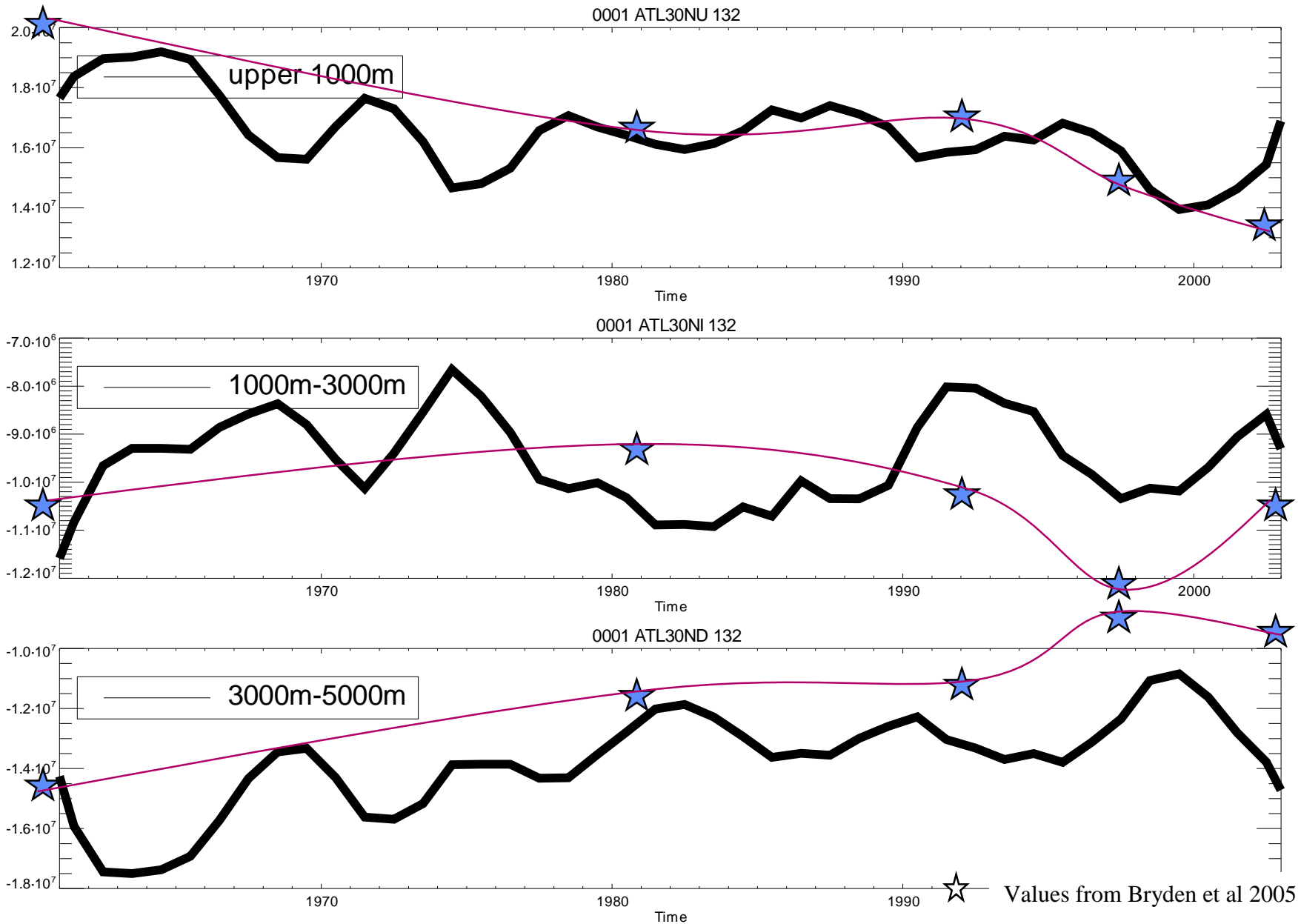
- 3D OI

ECMWF

Reanalysis time series : trends and variability (with uncertainty from 5 ocean analysis)

Climate Signals….

North Atlantic:

T300 anomaly

North Atlantic:

S300 anomaly

North Atlantic:

Meridional Transport 30N

THC: Atlantic Meridional Transport (30N)

Values from Bryden et al 2005

Summary

- **The ocean analysis in S3 shows decadal variability and trends in the North Atlantic,**

    - The trends in the upper heat content are large compared with trends in salinity and THC

    - the THC variability is broadly consistent with Bryden etal 2005.

        - The level of "noise" (interannual variability) is large.

        - The decadal variability/trends is weaker if no data is used

- **Questions:**

    - Given a THC signal in the initial conditions, how long would it last in the coupled models?

    - What is the impact on the climate?

    - How realistic is the variability?

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