AS ESTIMATED FROM SATELLITE ALTIMETRY

Saskia ESSELBORN
Universität Hamburg, Institut für Meereskunde, Germany
now at: GKSS-Research Center, Geesthacht (saskia@gkss.de)

Laury MILLER, Robert CHENY
NOAA, Laboratory for Satellite Altimetry, Silver Spring, MD USA

INTRODUCTION
Heat content deviations have been derived for the subtropical and the subpolar North Atlantic from sea level data measured by the satellite based radar altimeters Topex/Poseidon, ERS-1, and ERS-2, from October 1992 to September 1999. Oceanic heat storage and its relation to the dominant mode of atmospheric variability in this region, the North Atlantic Oscillation (NAO), are investigated on the interannual time scale.

SEA LEVEL CHANGE
The 1st mode of an empirical orthogonal function (EOF) of sea level anomaly relative to the mean annual cycle (Figure 2) accounting for 34% of the total variance, exhibits a dipole structure with centers in the subpolar and subtropical gyres. The corresponding time amplitude function (Figure 3) and the time integral of the NAO-index (Figure 4) both change sign between summer 1995 and spring 1996. To highlight these changes, we define two periods A - during positive NAO conditions, and B - during near zero NAO conditions.

SUMMARY
Altimeter data suggests that large scale, interannual patterns of oceanic heat transport are associated with the NAO. Between summer 1995 and spring 1996, the subpolar region lost about 1.4x10^21 J. The present analysis shows that most of this region gained about 3.1x10^21 J and the region between 40°-50°N oceanic heat loss and gain in the North Atlantic are related to the wind driven heat transport associated with the downturn in the NAO.

CHANGES IN MERIDIONAL EKMAN TRANSPORT
The changes evident in Figure 4 may be explained in part by anomalies in the wind driven heat transport associated with the downturn in the NAO.

ZONALLY INTEGRATED HEAT STORAGE CHANGE
Table 1 gives the zonally integrated heat storage change for three regions: subtropics (20° to 40°N), transition zone (40° to 50°N), and subpolar (50° to 65°N).

REFERENCES