

Heat Transfer and Storage, and their Changes in the North Atlantic Ocean

Neil C Wells*

Simon A Josey#

Sheldon Bacon#

Harry L Bryden#

*ncw@soc.soton.ac.uk

School of Ocean and Earth Science

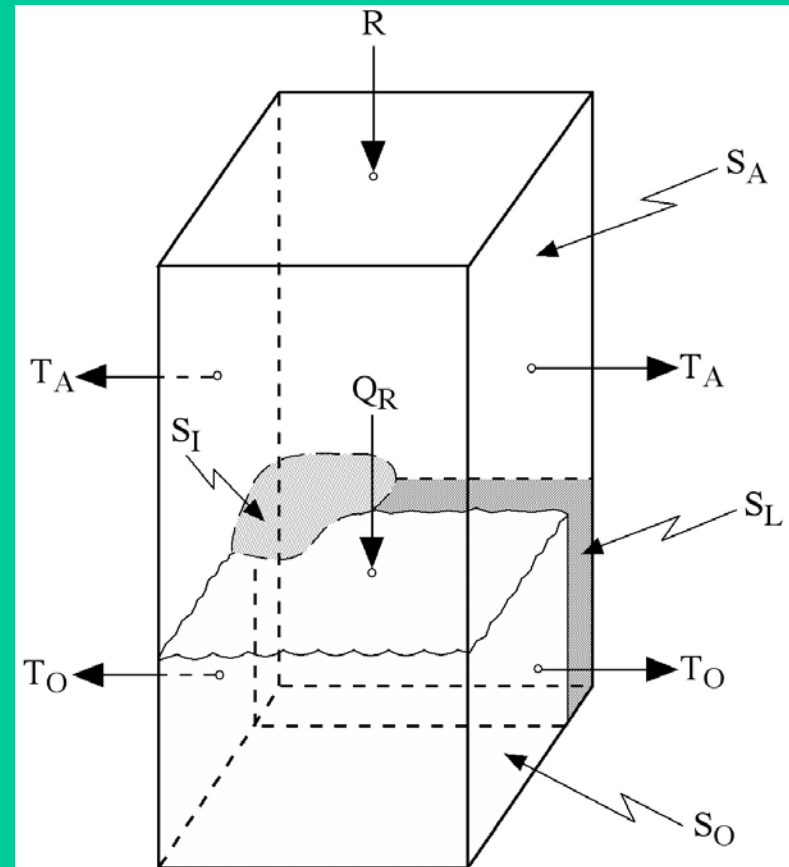
James Rennell Division

Southampton Oceanography Centre

Southampton SO14 3ZH

The problem

- The heat budget in a column of ocean is determined by three components: heat storage (S_0), heat transport (T_0) and heat transfer between ocean and atmosphere (Q_R)
- $dS_0/dt + T_0 = Q_R$



The problem

- Previous work assumed that storage is small compared with heat transport and heat transfer
- However, changes of heat storage have been shown to be not negligible (eg repeat WOCE sections)
- Propose to determine heat storage (S_0) from mid-1990's

Measurement of Heat Storage

- ARGO floats can measure Temperature from surface to upto 2 km depth.
- Repeat time ~ 10 days
- At present over 200 floats in N Atlantic with 71 North of 48 N
- In addition earlier Palace floats (from mid-1990's) now available
- Some ARGO floats also measure Salinity, hence can determine water mass.

Issues

- Are there sufficient floats to obtain heat storage from 24 N to 60N ?
- Temperature/Depth accuracy ?
- Additional data sources ?
- Only up to 2 km depth ?

Outcomes

- Provide a measure of changes in heat storage from 1996- 2004 in the North Atlantic between 24N and 60N
- With additional heat transport measurements (eg WOCE and Rapid) and surface heat flux from (eg SOC climatology and Rapid) we aim to close budget.

Personnel

- PDRA for 3 years ... starting this year
- Tied student starting , *if possible*, later this year