

Shifts of the Subtropical Shelf Front controlled by atmospheric variations

September 3 2013

In the western South Atlantic, off the coast of South America, a band of cold, fresh, nutrient-rich Sub-Antarctic Shelf Water (SASW) meets warm, salty, nutrient-poor Subtropical Shelf Water (STSW) to form the Subtropical Shelf Front (STSF). This front is the shallow-water expression of the major Brazil-Malvinas Confluence Zone and has moved northward and southward during the Holocene (the past ~12,000 years).

Bender et al. reconstruct the latitudinal shifts of the STSF over the past 11,000 calendar equivalent years using records of oxygen and carbon stable isotope compositions of benthic foraminifera and total organic carbon and calcium carbonate content from a [sediment record](#) collected off Uruguay. These measurements serve as proxies for ocean water temperature and nutrient content, which can be used to distinguish the SASW and STSW.

The authors identify the latitudinal shifts in the location of the front. In general, they suggest that the movements are controlled by large-scale atmospheric forcings. Before about 9400 years ago the STSF was located south of 36 degrees south (the position of their [sediment core](#)) because of a southerly location of the Southern Westerly Winds (SWW). Between 9400 and 7200 years ago the STSF migrated northward, reaching north of 36 degrees south, driven primarily by northward movement of the SWW. After 4000 years ago the STSF oscillated around latitudes close to 36 degrees south, possibly because of an intensification of the El Niño–Southern Oscillation. Notably, during the

past 200 years the STSF migrated southward, probably because of a southward shift of the SWW caused by [global climate change](#).

More information: Bender, V. Holocene shifts of the Subtropical Shelf Front off southeastern South America controlled by high and low latitude atmospheric forcings, *Paleoceanography*. DOI: [10.1002/palo.20044](https://doi.org/10.1002/palo.20044) , 2013 [onlinelibrary.wiley.com/doi/10.../palo.20044/abstract](https://onlinelibrary.wiley.com/doi/10.1002/palo.20044/abstract)

Provided by American Geophysical Union

Citation: Shifts of the Subtropical Shelf Front controlled by atmospheric variations (2013, September 3) retrieved 24 April 2024 from <https://phys.org/news/2013-09-shifts-subtropical-shelf-front-atmospheric.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.