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Corresponding Author : Prof. Ya Hsueh (yhsueh@garnet.acns.fsu.edu)

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Title: A pressure-driven South China Sea Warm Current (oa2)

Abstract: Imposed pressure along the continental shelf break is shown to generate, in accordance with the arrested topographic wave (ATW) theory, a steady-state flow that resembles the South China Sea Warm Current (SCSWC), flowing northeastward year-round along the outer continental shelf off the southern coast of China. The requisite shelf-break pressure distribution arises from the collision with the continental slope near the Dongsha Islands at about 116E and 21N, of the Kuroshio that has intruded into the South China Sea through the southern part of the Luzon Strait. The flow deflection following the collision creates the South China Sea Branch of Kuroshio (SCSBK) as a splinter current to the southwest, while the main stream of the Kuroshio veers to the northeast and eventually exits the South China Sea through the northern part of the Luzon Strait. A channel flow model driven by an inflow-outflow condition at one end and closed at the other suggests the SCSBK may be feeding the SCSWC all along the shelf break through a weak onshore flow driven by the gradual drop in pressure in the SCSBK due to bottom friction. The SCSWC and SCSBK flow combination is also found in a Bryan-Cox model of the northern South China Sea. The SCSWC in the Bryan-Cox model thrives in summer and survives only near the shelf break during the winter when the northeast monsoon wind dominates.

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Co-Authors

No.	Title	First Name	Family Name	Organization
1	Dr.	Liejun	Zhong	University of Maryland Center for Environmental Science