Analysis of wind data over the past 40 years and results from a high-resolution general circulation model revealed the existence of a previously undescribed circulation, named the South China Sea Throughflow (SCSTF). Variations in this flow can convey variations in the Pacific to the Indian Ocean. The SCSTF is not forced by local wind, but is affected by variations in the Pacific low-latitude western boundary current and the bifurcation of the North Equatorial Current: It grows stronger during El Niño years and weaker during La Niña years. In the Makassar Strait, the flow is merely a consequence of interplay between the SCSTF near the surface and the Indonesian Throughflow in the thermocline; the SCSTF inhibits warm Pacific water from flowing southward. Though its volume transport is only 1-2 Sv, about an order smaller than the Indonesian Throughflow, the SCSTF has a notable impact on the Indonesian Throughflow heat transport.