

## **Agulhas Current**

### **Introduction**

The Agulhas Current is the world's second fastest ocean current and is known best for resulting in two occurrences. The first is causing potential peril on ships by way of rogue waves; the second is playing an important role in global climate patterns by way of influencing ocean temperatures. The Agulhas Current flows from northeast to southwest down the South African coastline between 27 and 40 degrees south latitude. The current generally flows along or near the continental shelf, and at times the speed of the current can reach approximately 5 knots. When the current reaches Cape Agulhas, or just west of Cape Town, South Africa its speed becomes strong enough that the current loses its ability to hold the continental shelf and reverses direction and begins heading back to the northeast. (See Figure 1) This flow heads back into the Indian Ocean and aids in recirculation of the Agulhas Current. The Agulhas Current aids in transporting warm water from the Indian Ocean and Mozambique Channel pole ward. The Agulhas Current also feeds two other ocean currents; the Benguela Current in the South Atlantic, and the Antarctic Circumpolar Current.

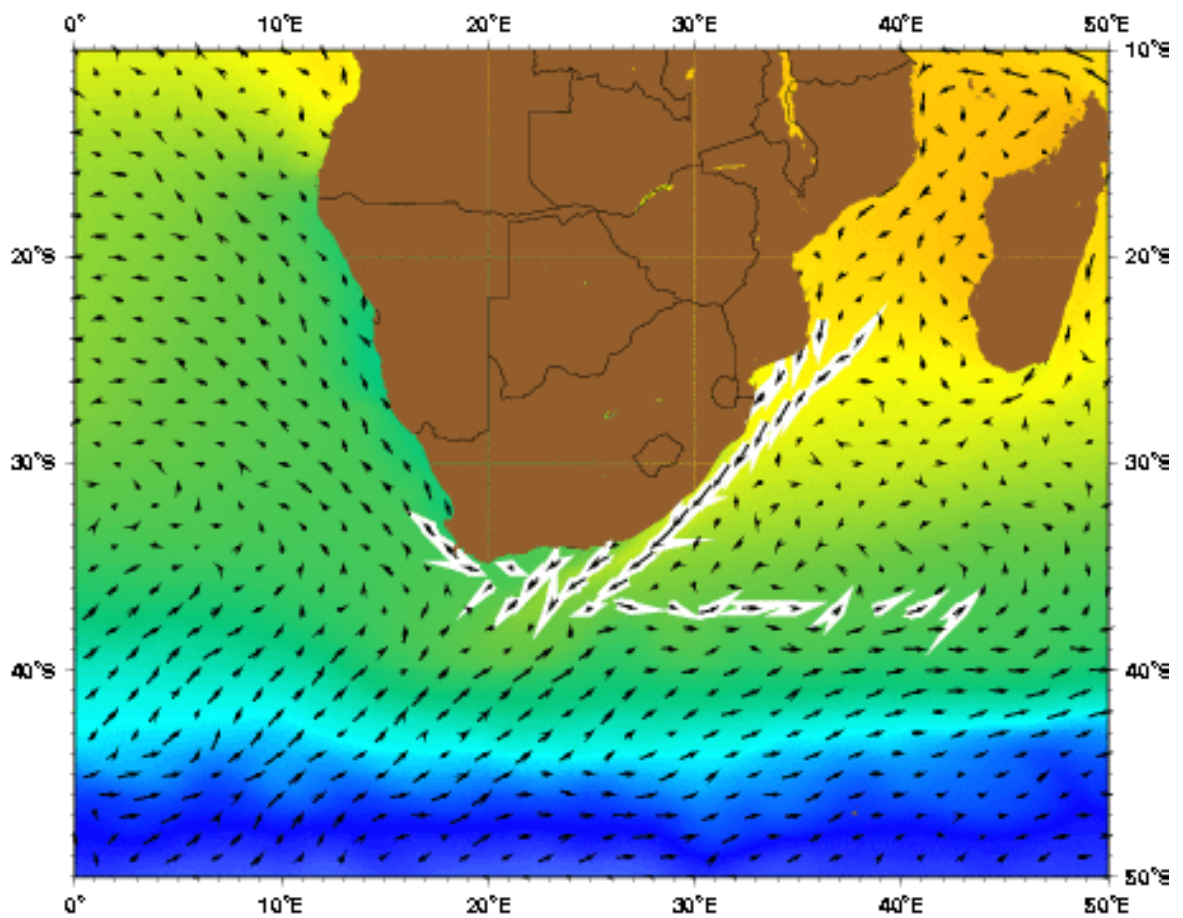
The current core runs seaward of the 100 fathom line, and Weathernews requests vessels to keep shoreward the 100 fathom line based on our current DB ( Analysis and Forecast.) ( See Figure 4. )

## **Effect on Ships**

The Agulhas Current poses its greatest danger to the shipping industry during the southern hemisphere winter season, or during the months of June-August. During these months, strong low pressure systems often develop near Antarctica and travel rapidly to the northeast, along with long trailing cold fronts on their north side. As these low pressure systems approach the Agulhas Current from the southwest, northeasterly winds will often precede frontal passage. These northeasterly winds flow in the same direction of the current, and often can result in the current speeding up by 1-2 knots from its usual speed. After frontal passage a rapid wind shift from northeast to southwest occurs and this is when freak waves are likely to happen. As the southwest fetch over the ocean continues, large waves of 5-10 meters can build with time. On certain occasions, these waves can combine with the Agulhas Current approaching from the opposite direction, as well as northeast to southwest moving swells generated prior to frontal passage to create massive freak waves which have been reported to reach 30 meters. (See Figure 3) There is still no definitive answer as to why the combination of the southwest swell and current produces such freak waves, or why it only happens on certain occasions. There have been numerous vessels that have either been sunk or seriously damaged by these waves since the 1800s. Even more intriguing is the fact that these waves often have an extremely short lifespan, lasting in most cases less than 30 seconds to 1 minute. Therefore, the chances of a ship being struck is rather low, further indicating there are likely numerous of these freak waves generated in the Agulhas Current given several ships report them each year. Eyewitness reports from ship captains and crew have proven that you will often know when one of these waves is about to strike, even before it is visible. Freak waves generated in the Agulhas Current are unusually steep with short periods, as opposed to bell shaped as most ocean waves are. This results in a large trough preceding the wave, or as many ship captains have called it, an apparent “hole in the ocean” where the sea level seemingly drops off considerably.

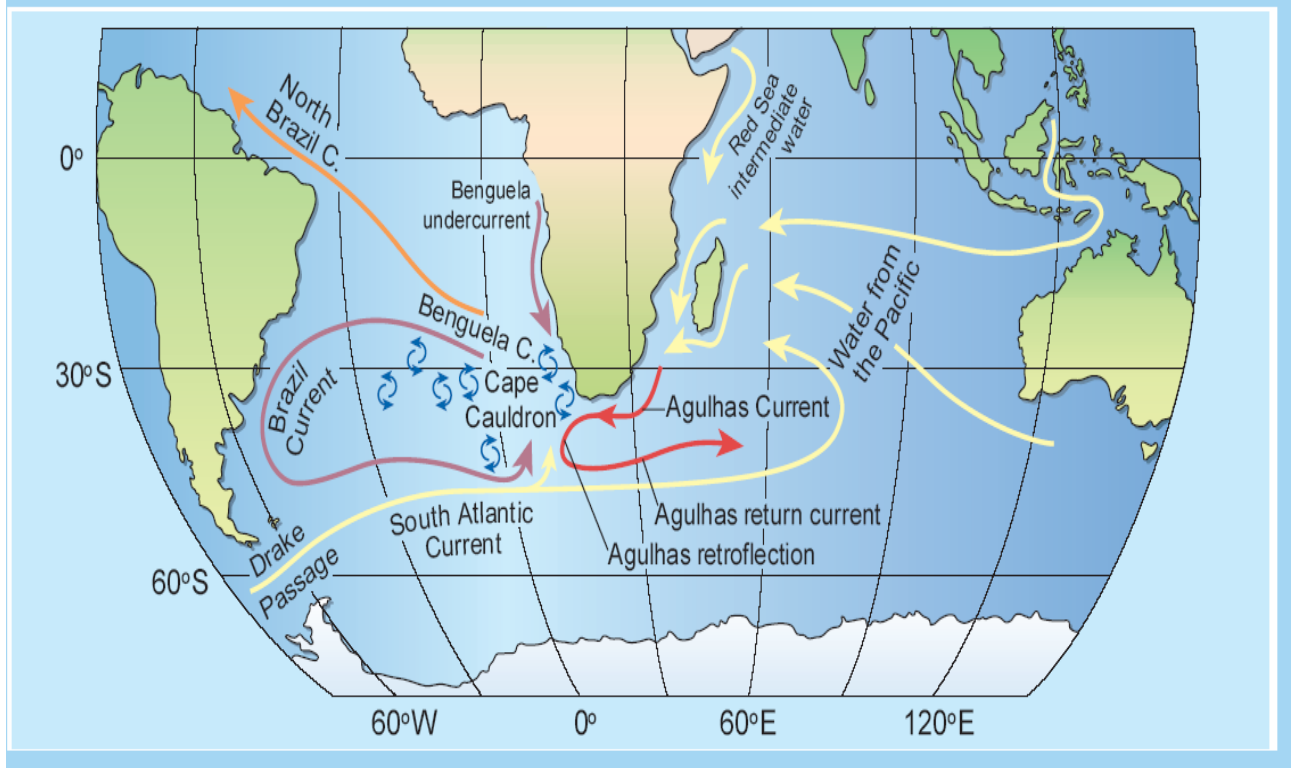
## **Ocean temperature/Global climate influence**

The Agulhas Current influences ocean temperatures and hence the global climate patterns in a rather simple manner. Approximately 6-8 times each year on the western most edge of where the Agulhas Current reverses direction it will shed off rings of water which rotate their way into the South Atlantic Ocean. These rings of water can range from 100-300 km in diameter and contain pools of water which are much warmer and have a higher salinity than the water in the South Atlantic Ocean. Once entering the South Atlantic, these rings are transported across to the western and northwestern side of basin by way of the Benguela Current of the South Atlantic. As a result, ocean temperatures can be greatly effected in the South Atlantic and on a larger scale the weather patterns in both the Southern and to a lesser extent in the Northern hemisphere. (See Figure 2) Finally, the Agulhas Current helps to transport warmer and saltier waters to the Antarctic Circumpolar Current. This transfer also occurs on the Agulhas Current's western edge where the flow turns back on itself allowing a southward transport of some its water down to the polar region.



**Figure 1:** Basic flow of the Agulhas Current from northeast to southwest. Note the reversal of direction once past Cape Town, South Africa back towards the east. Transport of warmer water temperatures to the south and west can easily be seen through color depiction of sea surface temperatures. *Courtesy of Miami.edu*

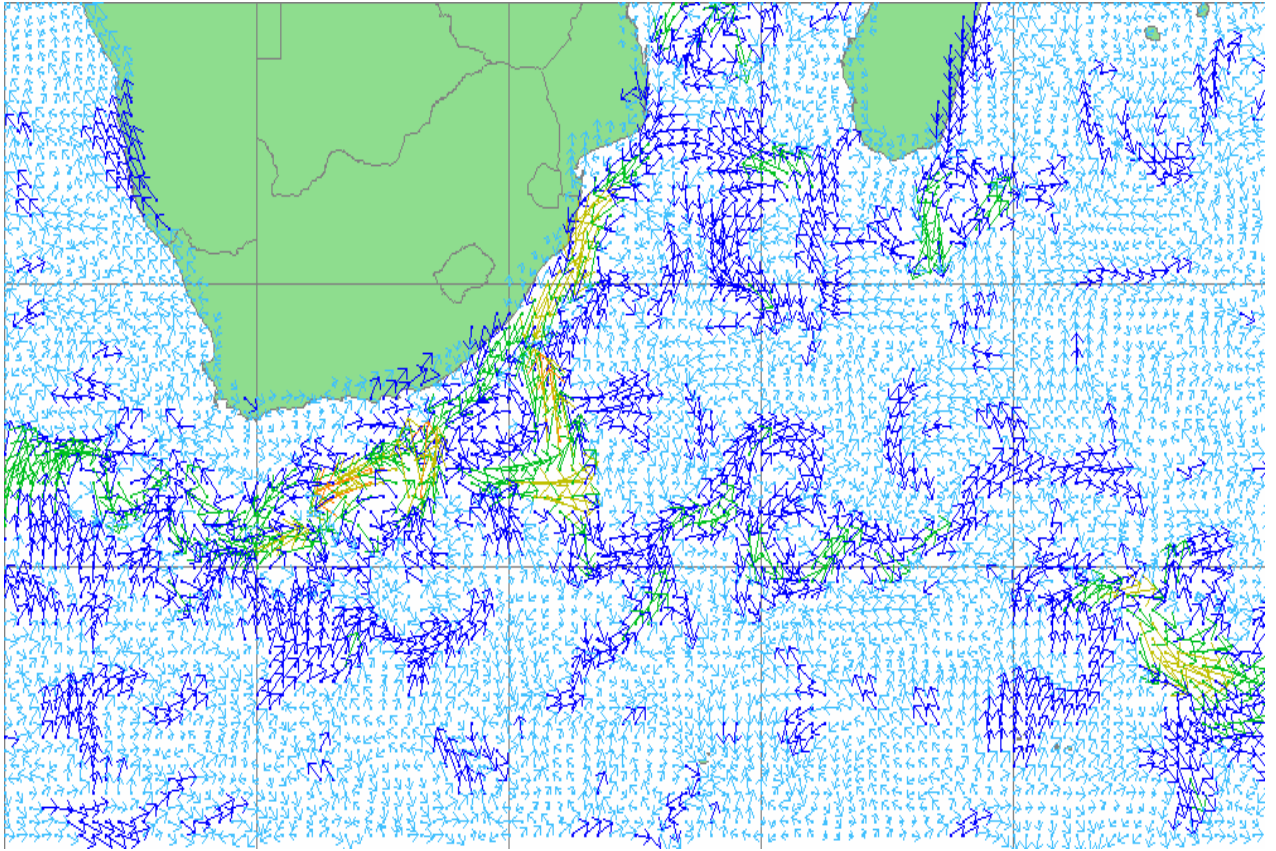
## The Agulhas Current Retroflexion in the Southern Ocean



**Figure 2:** This figure indicates the transfer of warm and saltier ocean water from the Indian Ocean by The Agulhas Current to the South Atlantic. In addition, the method of transport by way of the Benguela Current is illustrated. *Courtesy of Clivar.org*



**Figure 3:** Photo of one of the Agulhas Current induced freak waves taken in 1980 off the oil freighter Esso Languedoc. Though not one of the larger Agulhas Current freak waves, the wave was estimated to be as high as 10 meters. *Courtesy of University of Oslo, Norway.*



**Figure 4:** NLOM and NCOM based 1/32 deg Grid Point value based Analysis and Forecast for next 10days with climatology data.

Weathernews Hybrid Original Current data can monitor the latest and future situation For the optimum Ship routeing around this area too.