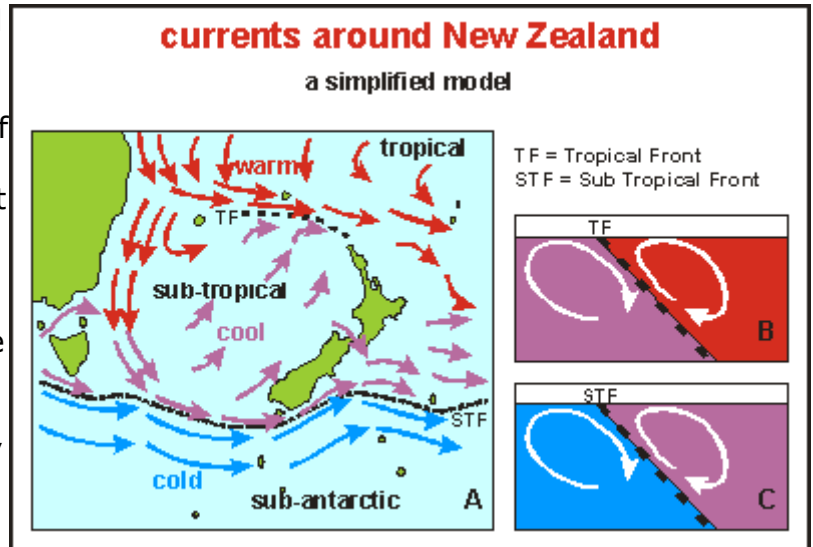


CURRENTS AROUND NZ

This map shows the principles behind the currents found around New Zealand and in the Tasman Sea. The South Equatorial Current (far north of this map), which is very warm as it reaches Australia's east coast, is bent southward by Coriolis forces and by this coast. At Australia's easternmost point, it splits and one part veers east, deflected by Coriolis forces. The other half follows the east coast down until it meets cool water passing around Tasmania. On its way south, it meets the cold water of the West Wind Drift and a front or convergence forms because water masses of different temperature and salinity, mix with difficulty. In diagrams B and C, such a front is shown in a very simplified way. The front acts as a wall between the two currents that spiral along it at either side. The STF effectively walls the Tasman Sea in. Water entering it from the north, cannot pass this wall and has to exit somewhere east of New Zealand, passing by Stewart Island, through Cook Strait and around North Cape.

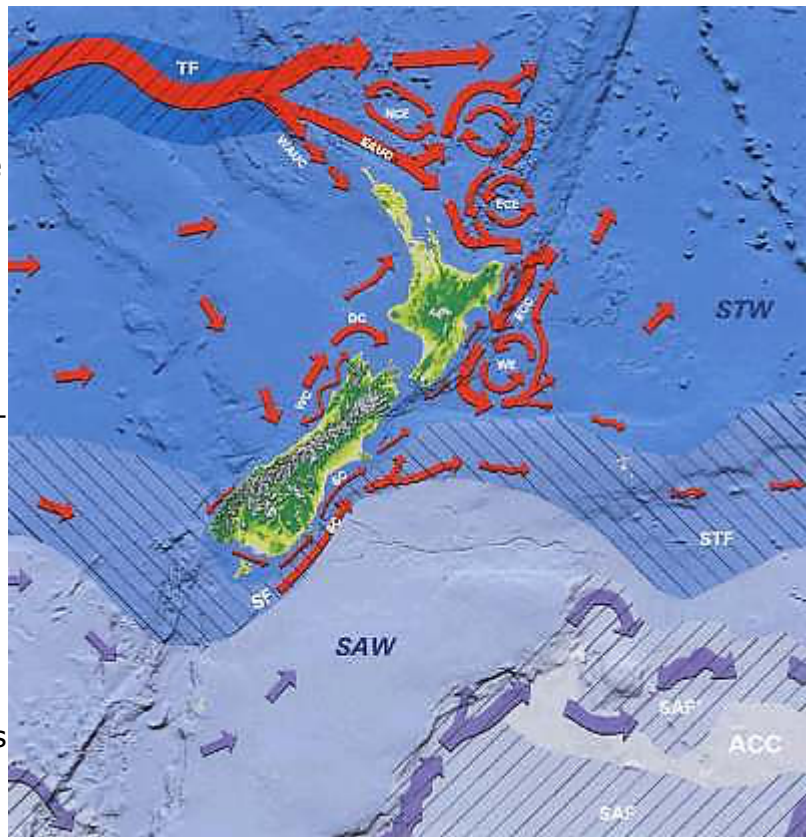


During the interaction along a convergence, nutrients are circulated to the surface, inviting for rich plankton blooms and fish production. At New Zealand's southernmost tip (Stewart Island), this cool current splits and the Subtropical Front passes very close to the shore, only to veer east again over the Chatham Rise in the direction of the Chatham Islands.

Deflected by Coriolis forces, cool water flows slowly north in the 'walled-off' Tasman Sea, to meet the warm water coming from the tropics. Again a front (Tropical Front) or convergence is formed between the two water masses, as shown in diagram B. The cool water pushes this front far enough north to concentrate a strong current over the northernmost tip of New Zealand. This East Auckland Current consists of both cool and warm water. Some of it flows eastward but enough remains to flow along the east coast of the North Island, at some 50-200 km offshore. The map below shows the most recent discoveries about the currents around New Zealand.

Note that in the above map and diagrams, and in fact in all current maps of the oceans, average water flows are shown. In reality currents consist of plumes spearheading forward, flanked by eddies. Eddies can separate themselves and live for a while as walled-in circulating basins. In the front cross-sections B and C, it is not shown that temperature decreases with depth on both sides of the front. At some depth (100-300m), temperatures become equal and the front disappears.

This map (Courtesy NIWA) shows the currents around New Zealand as they have been mapped by NIWA. Much research needs to be conducted to map the missing bits. Outside the southern end of the map one finds arctic water, as cold as it can get (1-2 degrees). Above it and showing as SAF is the Sub-Antarctic Front, marking a slight temperature gradient towards the Sub-Antarctic Water (SAW) of 2-6 degrees. At the bottom of the map runs the West Wind Drift from west to east.



The dark blue area belongs to Sub Tropical Water (STW) of 8-20 degrees, surrounding all of New Zealand, and bounded by the Sub Tropical Front (STF) down south and the Tropical Front (TF) up north.

The main current arriving from Australia is the East Australia current flowing eastward along the Tropical Front. It splits into an East Auckland Current (EAC), and a larger part that passes much further away. A number of permanent eddies have been discovered to the north and north-east.

The effects these currents have on New Zealand are:

The effects these currents have on New Zealand are:

- Warm currents make New Zealand's climate at least 2°C warmer than without.
- While cooling, the warm currents evaporate moisture that provides the rains necessary for a mild, moist climate.
- Nutrients well up along the convergence zones (TF and STF) and along the north-east coast of the North Island. It provides for good fishing.
- Nutrients are transported from Australia towards New Zealand's fishing grounds.
- The large differences in water temperature from south to north cause highly changeable weather.
- New Zealand's climate is spared the extremes of droughts and deluges found elsewhere in the world. In fact, New Zealand is one of the few places in the world, where rain falls in every season.

<http://www.seafriends.org.nz/oceano/special.htm#Currents>