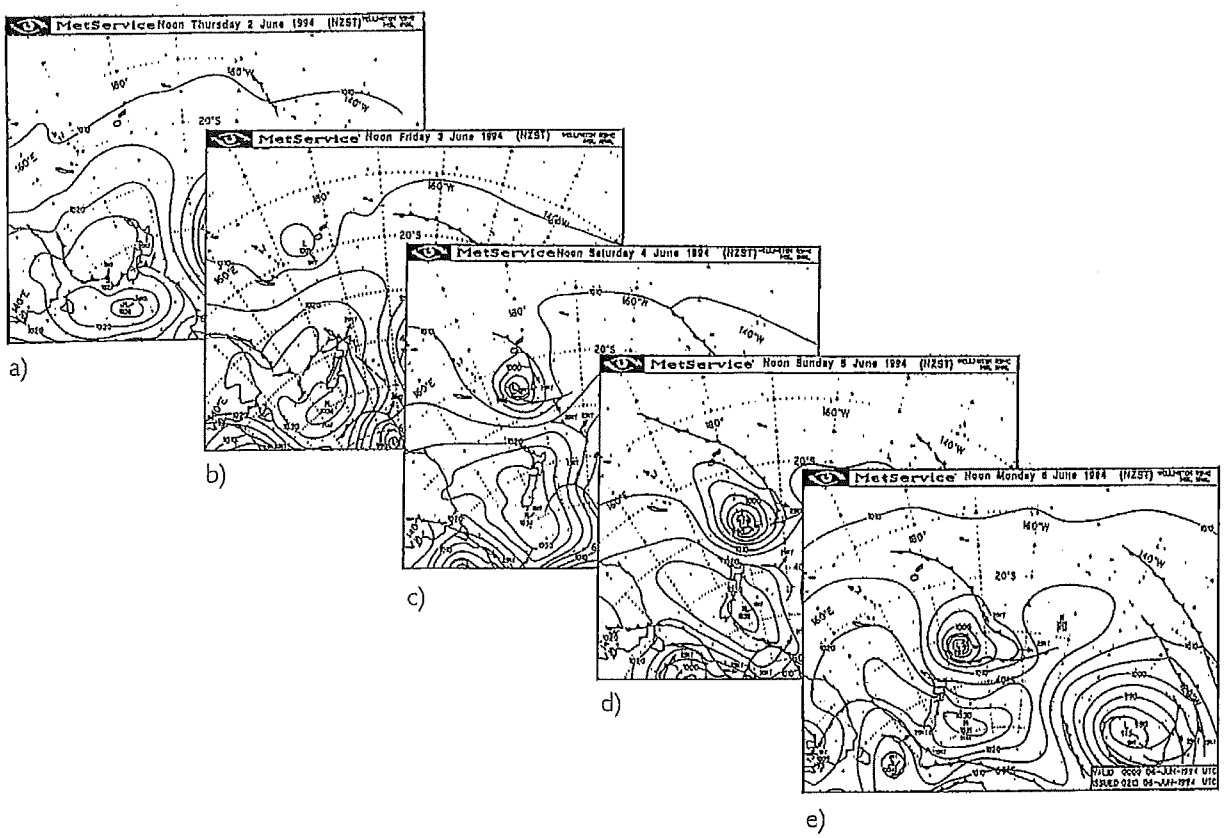
CASE STUDY
June 1994



a)

b)

c)

d)

e)

Introduction

The section on South Pacific Weather covers the weather systems and patterns that you may encounter, but nothing is more real than a true-life example. The case chosen is a subtropical low that BOMBED in early June 1994.

Any depression whose central pressure falls more than 14 hPa in 24 hours at 30 degrees latitude is described (in meteorological circles) as a "BOMB".

The South Pacific is mostly placid but occasionally fascinating. This case study is not meant to put you off your dream cruise, but it should give you something to compare with your own meteorological adventures.

During the cruising season about the South Pacific (May to October), weather systems to the south can be anticipated from a long way off as they travel the mid-latitude roller coaster. The main problem is caused by lows that form in the tropics (*yes, you do get tropical lows forming outside the cyclone season!)* and deepen in the subtropics (22–30° south). These lows can form quickly (in less than a day) and possibly even develop a small area of gale winds around them in the tropics. As they leave the tropics, if the timing is right, they *sometimes* encounter conditions that help them to deepen rapidly (see page 54) and then their gales expand into *a storm covering a large area for several days.* Seas can build to 10 m or more.

Any vessel equipped with storm sails and able to heave-to should be able to cope with a gale for a day or so. After several days of being in gale or storm conditions with waves 10 m plus, boat equipment starts to break and crew get worn down. Sea anchors are a must for a sailboat in a full-blown subtropical low. If at all possible, it is best to try and avoid subtropical lows by using the evasion paths shown in the previous chapter.

Tropical lows can occur at any time of the year. They are *least likely* at the end of the southern winter (Sep-Oct) when "High Index" weather is at its peak (see page 37). They are *most likely* in the start of the southern cruising season (May and June), when the sea is still ripe for forming tropical lows, but not warm enough to develop them further into cyclones.

"BOMBS" in the subtropics may deepen faster than a weather map can reasonably show. The resulting weather may change from fair to foul faster than a boat can travel. North Atlantic Bombs are well known by English sailors — for example, the Fastnet race in August 1979. The frequency of such storms in the South Pacific has not yet been determined exactly but is about two or four times a year. In June 1983, one such bomb destroyed the *Lionheart* and seven crew were lost as they tried to enter Whangaroa Harbour off the east coast of Northland (NZ). In June 1989, another bomb capsized the *Rose Noelle* and its crew of three drifted at sea for five months.

The June 1994 Storm

Refer to the weather maps over the page.

a) On Thursday 2nd June 1994, conditions were almost perfect for the voyage across the South Pacific from New Zealand to Tonga or Fiji. A high-pressure area was stuck over New Zealand, with steady trade winds from the Kermadecs to Tonga.

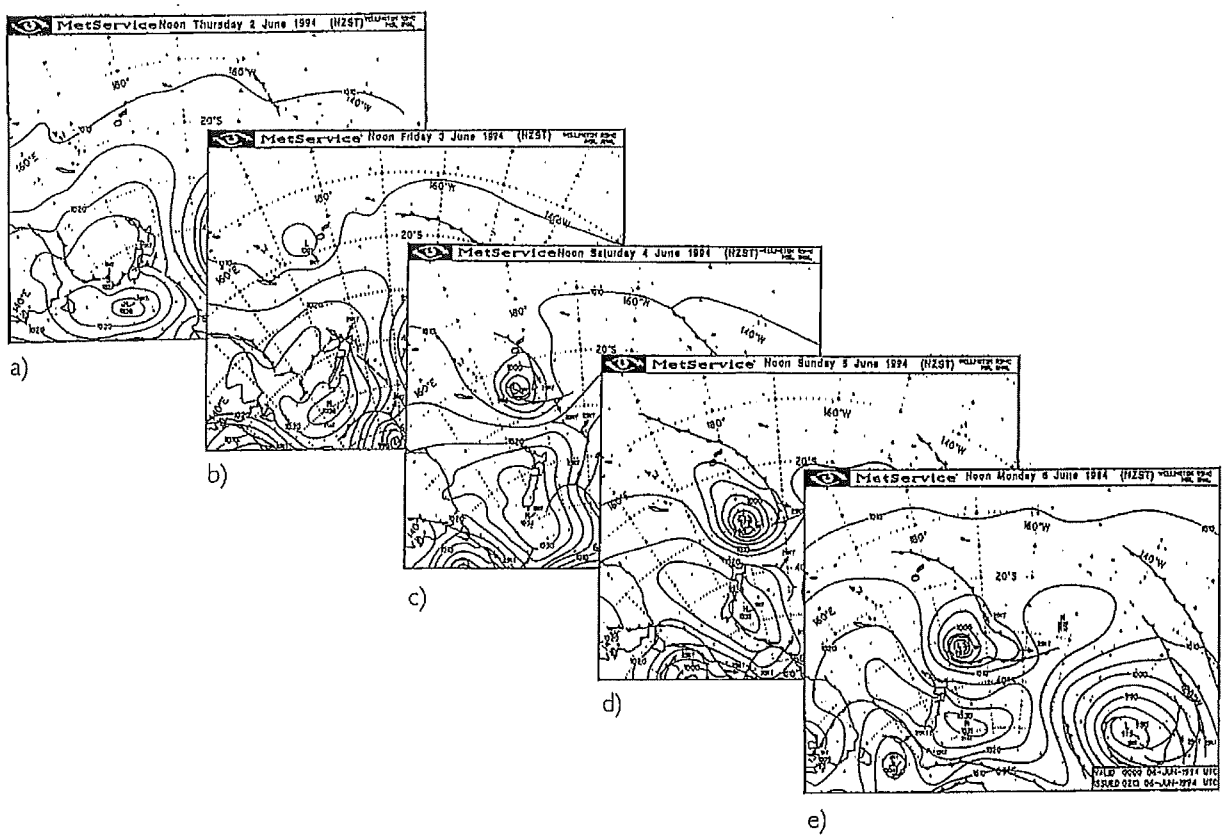
b) But on Friday 3rd, a tropical depression started forming between

Vanuatu and Fiji. It was NOT a tropical cyclone because it did not have the symmetrical warm central core that characterises such systems.

Only when this depression moved south out of the tropics did it deepen rapidly. This is because it started entraining very cold air, which had been brought all the way from 60° South by that high-pressure system

BOMB. Clockwise winds around the low centre accelerated to over 50 knots during Saturday, creating a confused, tossing sea with steeply sloped waves. Conditions near Raoul Island had turned from fair to foul within 24 hours.

d) The low pressure system reached its peak about 0600 UTC Sunday 5th June (6pm local time) with central



over New Zealand. When cold air meets warm air, the warm air is bumped upwards out of the way. If, as in this case, the upper winds remove the rising air faster than the lower winds can replace it, then the surface pressure in the immediate area falls rapidly.

c) Central pressure dropped from 1001 hPa at 0000 UTC Friday 3rd (noon local time) to 986 on Saturday 4th, making this system a meteorological

pressure about 978 hPa, generating a swell judged by rescue aircraft to be 10–14 m. A senior pilot of the New Zealand Airforce No. 5 Squadron with 10,000 hours experience commented that he had not seen anything like these wave conditions before.

From Saturday to Monday, 16 yachts in trouble set off EPIRB beacons, twenty-one people were rescued, but three lives and seven boats were lost.

In more ways than one, that high-pressure area over New Zealand was an accessory to the storm. Since the pressures remained HIGH (over 1030 hPa) on the south side of the depression, isobars there bunched together into a squashed zone of accelerating wind. Because of the high pressure holding on in the south, it is difficult for anyone in the path of the approaching low to detect its approach simply by watching the barometer. Vigorous winds come before the barometric warning. *(See squash zone 2, in the chapter on "Isobars and the Wind')*