

N.Z. Meteorological Office
Circular Note No.20.

The Synoptic Situation over the Central Provinces
during Friday, 3rd December, 1943.
By F/O Ramage.

History:

After a period of three days northeasterly weather, a weak cold front passed across the area on Thursday, 2nd December, 1943 accompanied by a narrow well defined band of moderate rain.

The air-mass characteristics changed from wPmU+ with frequent thunderstorms over the ranges, to kPmU- with stability rapidly increasing.

During Thursday night a second cold front began passing over the area preceded by the normal band of orographically reinforced rain, and followed by occasional light showers. By 0600 hours N.Z.C.T. on Friday it had just passed Wellington...

Although the pressures continued to rise behind the front, continuous rain, heavy at times had developed over all the central provinces. This great rain belt moved slowly eastward and had passed off the area by 2400 hours.

Discussion:

The most puzzling feature was the continued rise in pressure reported from every station behind the front, and in spite of the fact that it had been somewhat retarded in its passage across Tasman Bay and Marlborough Sounds, there was nothing to suggest the formation of a wave. However, by 0900 hours it was apparent that a circulation had been set up with its centre in the Straits.

This low although unconnected with the front, moved slowly southeastward through a region of rising pressures, finally filling up over Cape Campbell between 1500 and 1800 hours.

The low was initiated by the sweep of southerly air into the South Taranaki Bight, behind the cold front, and it produced the heaviest rainfall the central districts have experienced this year.

The explanation lies in the isallobaric pattern. At 0600 hours, on Friday although all tendencies were positive, there was a marked isallobaric trough from Ohakea to Farewell Spit, and a great packing of isallobars in the Straits.

By 0900 hours an isallobaric wedge was nosing into the Straits from the northwest, while a trough line lay southeast-northwest through Marlborough.

During the rest of the day this isallobaric trough moved westward and by 1500 hours an isallobaric wedge had built up in the region of the low, which rapidly filled up and disappeared.

In the eastern sector of the low winds were mainly light and variable and the rain continuous. In the western sector fresh or strong southwesterly winds predominated with only intermittent rain.

Throughout the day the low moved directly into the region of undernormal winds.

The thick sheet of nimbostratus which covered the whole rain area, appeared from an aircraft report to have formed at about 4000 feet near Kaikoura and remained as long as the circulation persisted.

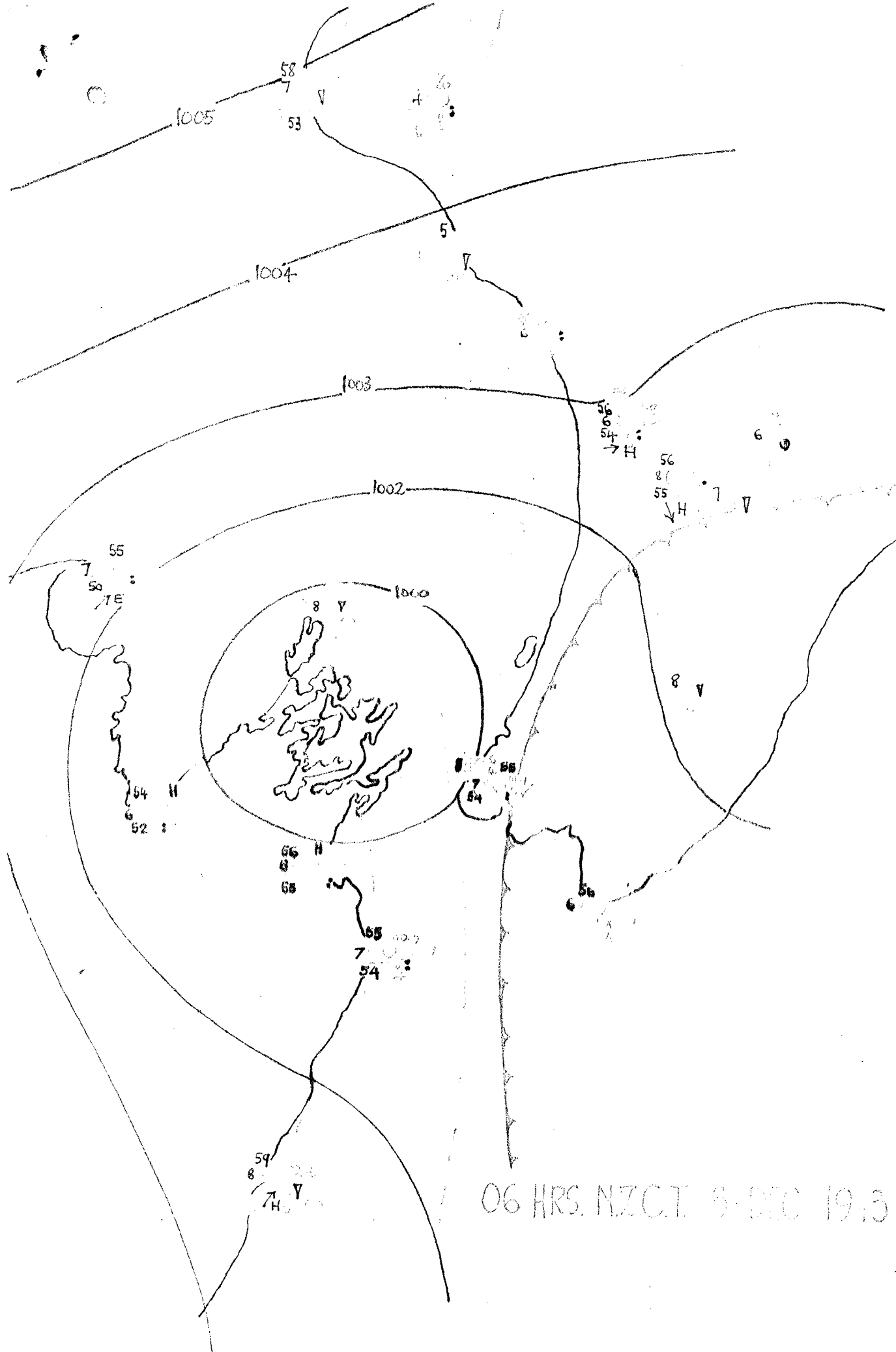
It developed at the sharp upslope surface separating the southerly air of the circulation from air which had moved in from the west-southwest.

Conclusions.

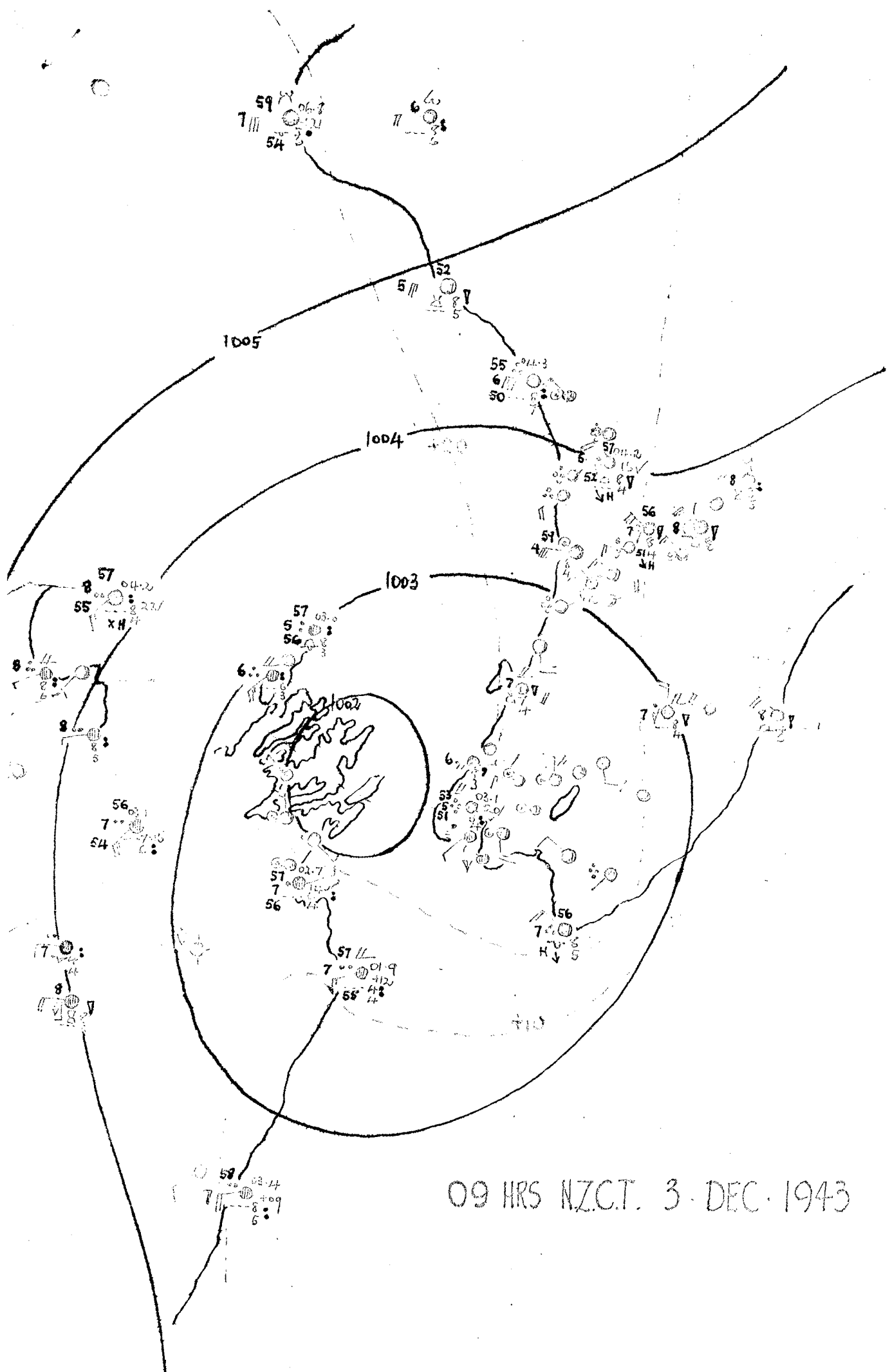
- (1) A purely orographic low may form without any negative tendencies occurring.
- (2) The comparative, and not the absolute tendency values seen to be the more important factor.
- (3) The low is most easily initiated in an air stream parallel to the South Island ranges which allows southwesterly as well as southerly air to flow into the South Taranaki Bight.
- (4) A sheet of altostratus quickly thickening to nimbostratus gives the initial warning that the rainfall will change from the shower to the continuous type and intensify considerably.

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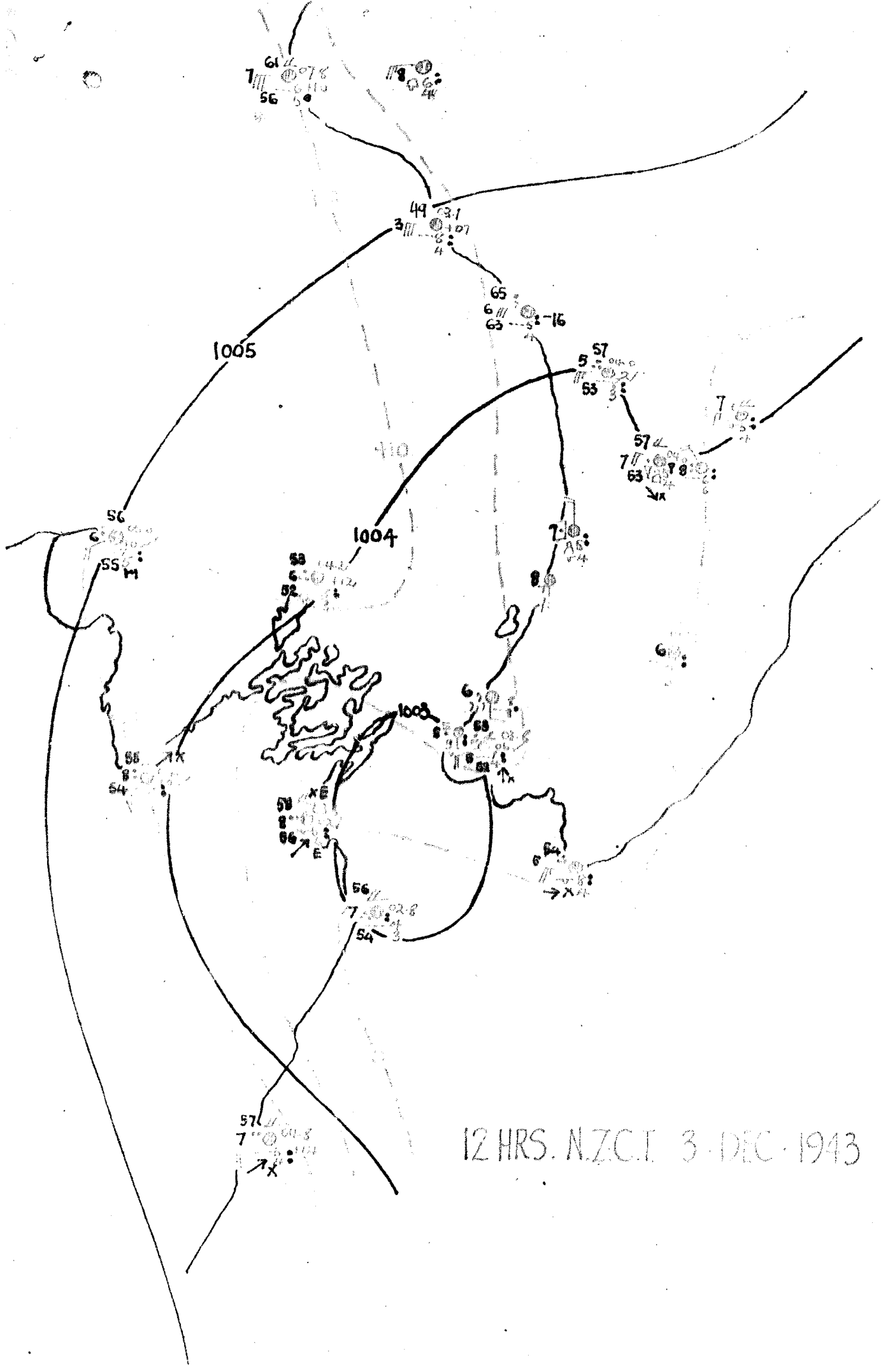
A very similar but not/intense situation occurred on Sunday, 19th March, 1944.



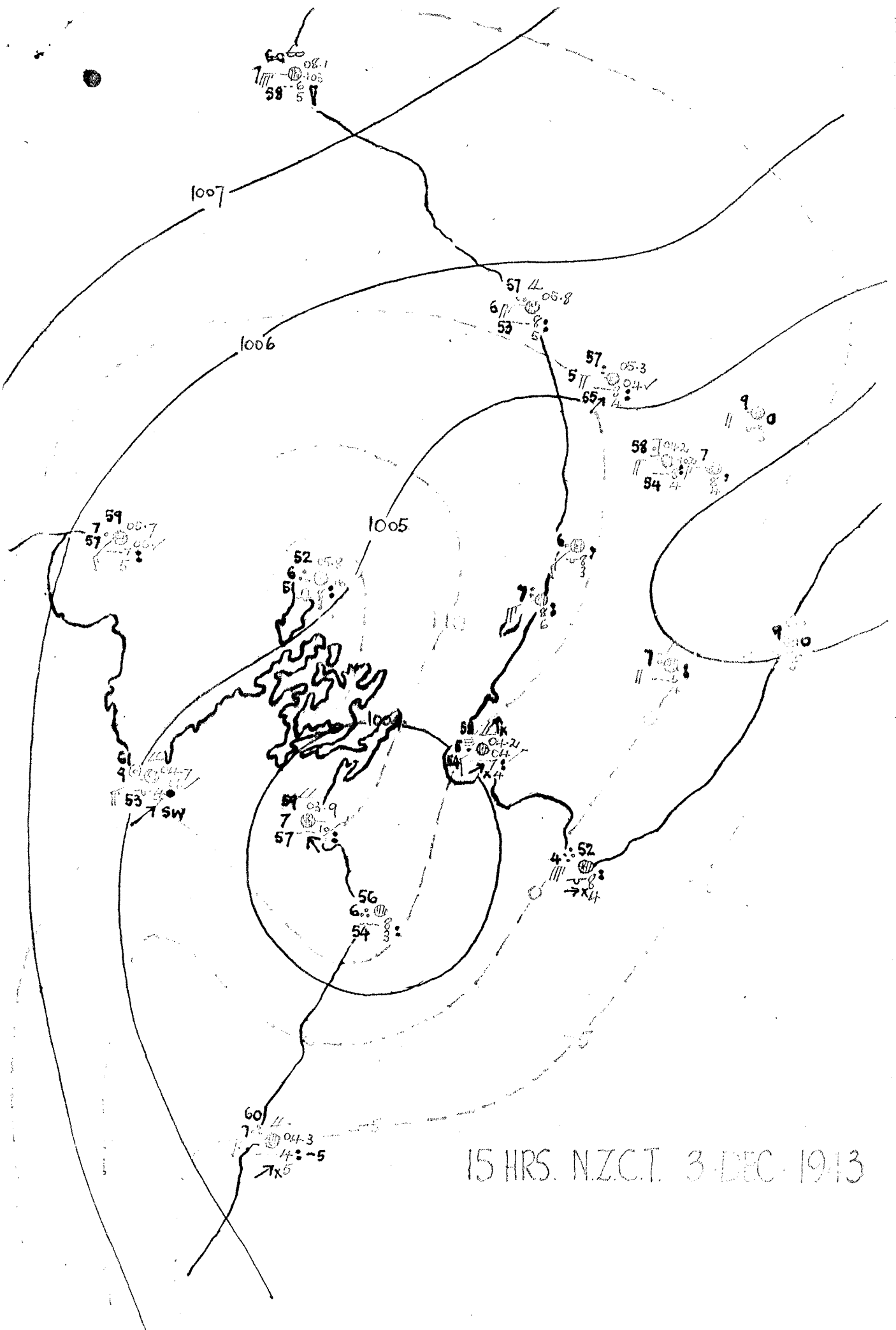
06 HRS. NZC.T. 3-DEC 1943



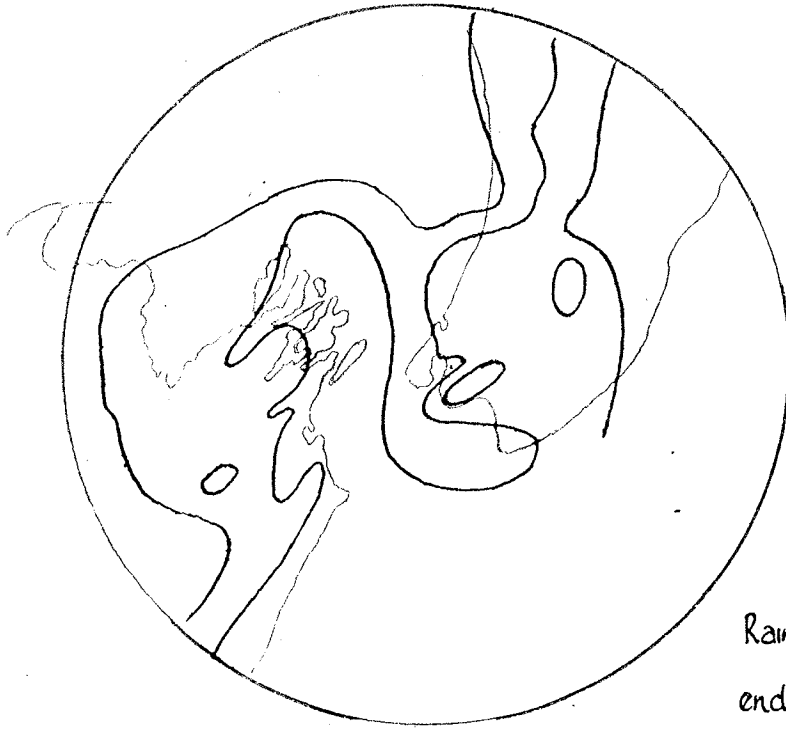
09 HRS NZ.C.T. 3 DEC 1943



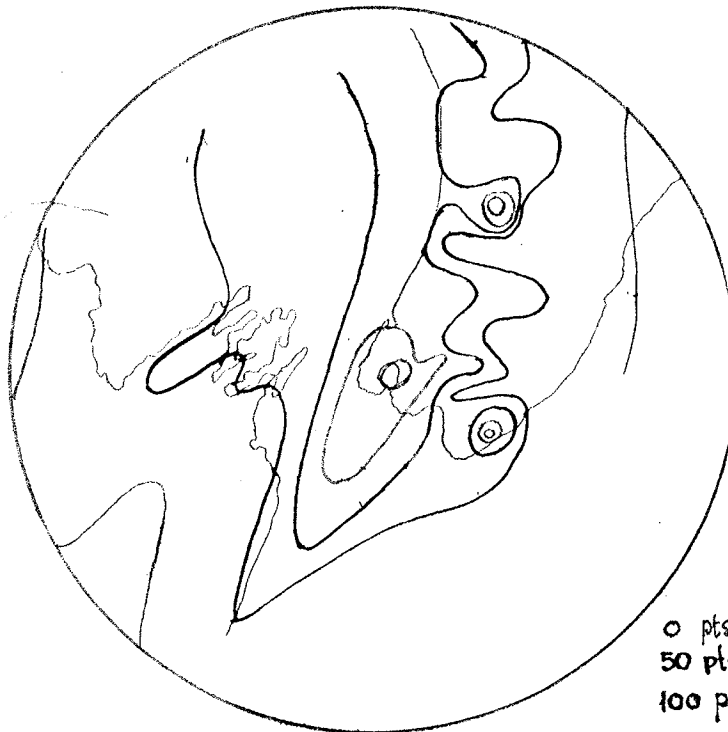
12 HRS. N.Z.C.T. 3 DEC. 1943



15 HRS. NZCT. 3 DEC. 1943



Rainfall for 24 hours
ending 9 a.m. 3-12-43



Rainfall for 24 hours
ending 9 a.m. 4-12-43

0 pts _____
 50 pts _____
 100 pts _____
 150 pts _____