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MINISTRY OF TRANSPORT

NEW ZEALAND METEOROLOGICAL SERVICE

THE CLIMATOLOGY OF CHRISTCHURCH INTERNATIONAL AIRPORT

Wellington, New Zealand—1982

PREFACE

This series of publications provides a summary of weather conditions experienced in the vicinity of New Zealand airports together with tabulations of climatological information of relevance to aircraft operations.

It has long been recognized that a great deal of knowledge of local weather in and about airports had been acquired by Meteorological Service personnel, other Ministry of Transport airport staff and pilots. Much of this knowledge had not been recorded. In this series of publications an attempt has been made to collate this information in order that it can be passed on to newcomers to a particular airfield.

A comprehensive questionnaire on local meteorological conditions was sent to all major New Zealand airports (Fig.1) for completion by appropriate personnel. The questionnaire was subdivided into seven sections, these being: surface winds, turbulence, visibility, low cloud, precipitation, representativeness of observations with respect to locality, and a general section to include any important local information not previously adequately covered. It has been designed so that the replies would be from the point of view of aviation operations and were to represent the local experience and impressions of the personnel concerned.

The descriptive material used in this summary has been obtained by collating the replies from questionnaires. Consequently, those who completed the questionnaire have had the major influence in what is included.

The climatological tables and summaries of weather elements observed at meteorological stations at airports have been compiled from the Meteorological Service's archives stored at the Trentham Computer Centre.

The publications are therefore a summary of what is known about the weather at and about particular airports based on the knowledge of those with considerable experience of weather study at the airports and on the analysis of climatological statistics. They have been carefully prepared and the statements they contain will be generally correct. However weather can be very variable and every possible variant is not necessarily included.

THE PUBLICATIONS ARE INTENDED TO SERVE AS GUIDANCE ONLY. THEY SHOULD IN NO WAY SERVE AS A SUBSTITUTE FOR CAREFUL CONSIDERATION OF FORECASTS, WEATHER REPORTS AND OBSERVATIONS.

These publications are in accordance with recommendations (C.3.1.) 8.2 and 8.3 in the World Meteorological Organization Technical Regulations.

The Meteorological Service gratefully acknowledges the help of all those people who have participated in compiling answers to the questionnaire. Without their help, this project would never have been accomplished. Although many people have participated in this work special mention should be made of Dr D.C. Thompson who initiated the project, Mr D.I. Patterson who coordinated and checked the replies to the questionnaires and to Mrs G.H. Thompson and Mr C.S. Thompson who both assisted in completing this publication.

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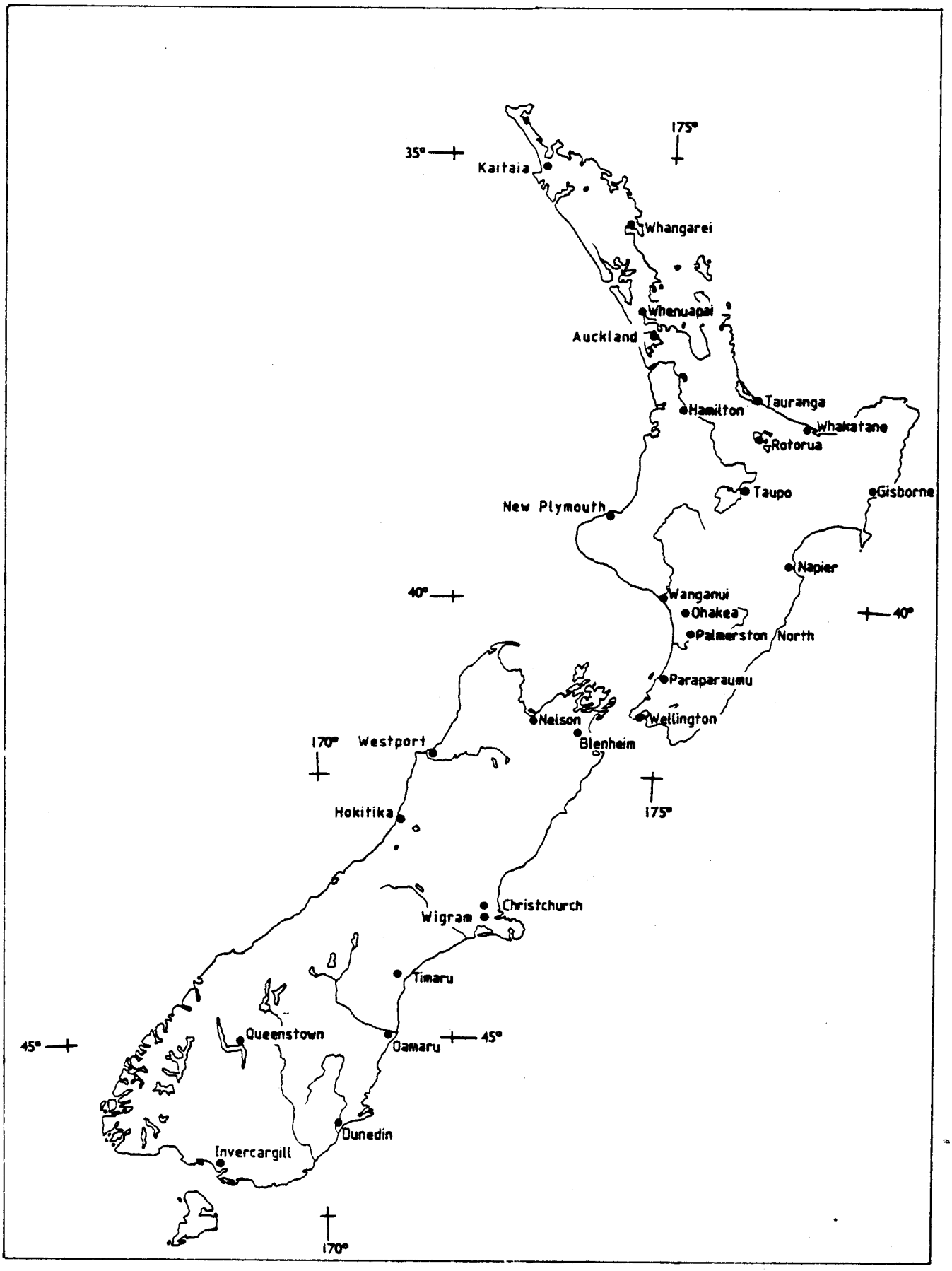
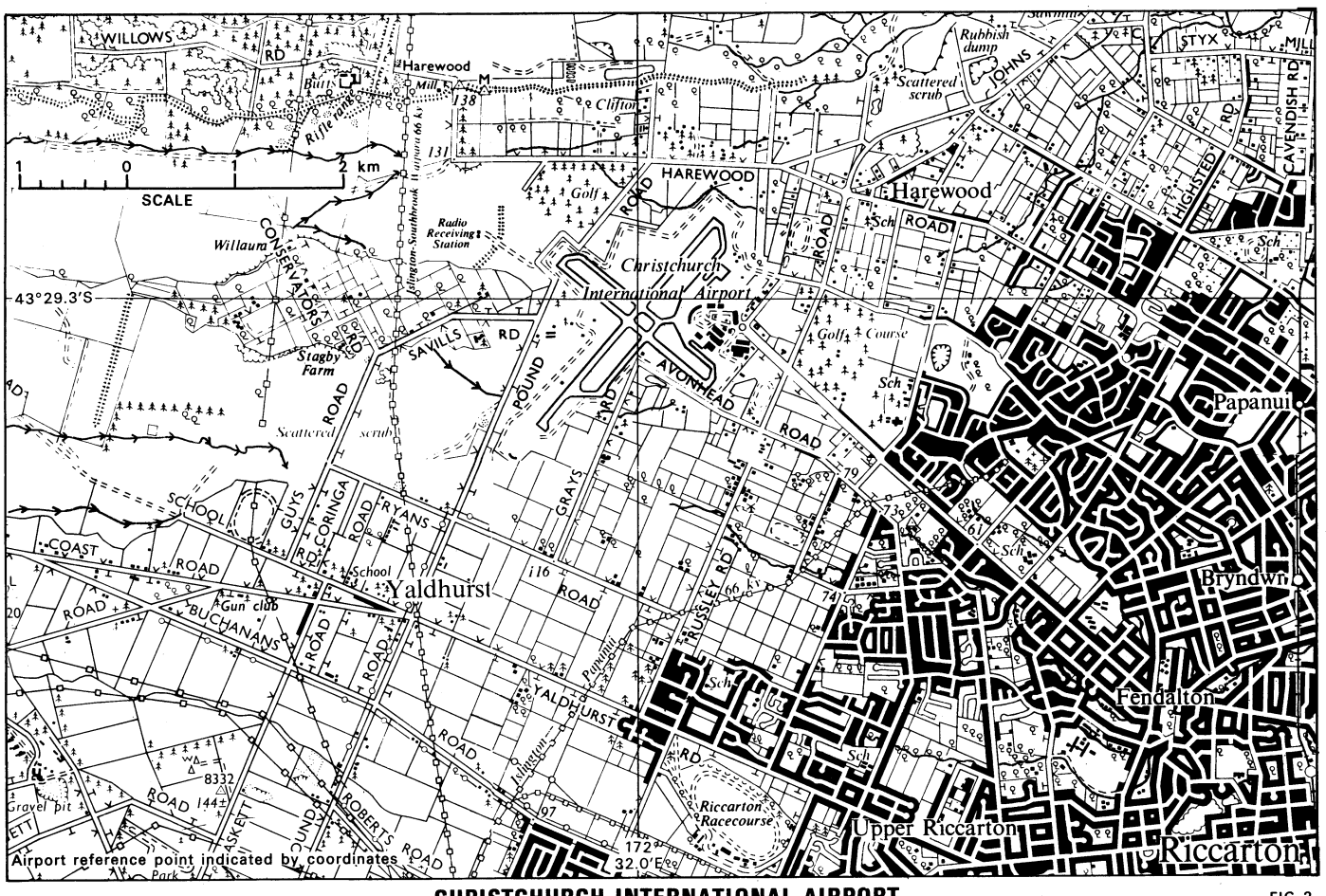


Fig.1 - LOCATIONS OF MAJOR AIRPORTS AND R.N.Z.A.F. BASES.



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CHRISTCHURCH INTERNATIONAL AIRPORT

FIG 2

THE CLIMATOLOGY OF CHRISTCHURCH INTERNATIONAL AIRPORT

1. Introduction

Christchurch International Airport is situated in the northwestern outskirts of the city (Fig.2) at a height of 37 m above sea level. It lies on the northeastern part of the extensive and flat Canterbury Plains some 15 km from the coast and about 2 km south of the Waimakariri River. The principal runway is designated 02/20 (i.e., aligned from 020° to 200° magnetic), and there is a secondary runway 29/11.

The Port Hills which form the western extremity of the elevated area of Banks Peninsula rise to 550 m (1800 ft) are about 15 km southeast of the Airport. To the west the plain rises gradually to reach an elevation of 300 m (1000 ft) at a distance of about 50 km where the foothills of the Southern Alps begin. Consequently the approaches to the runways are completely unobstructed and the airport can remain open in conditions of very low cloud and visibility.

The weather observations are normally made from the roof or the vicinity of the airport terminal building. The observations are fully representative of the conditions prevailing at the airport and surrounding area. The anemometer site, located near the runway intersection is well exposed.

The climate of the Christchurch area is largely determined by the wind regime of its latitude zone and by the broad scale orography of the region including the Southern Alps and Cook Strait. A summary of climatological observations made at Christchurch Airport is contained in Table 1. With the exception of mean monthly/annual QNH the table is based on observations made once a day at 9 a.m. (local time). Notes on Table 1 are as follows:

(a) Rainfall

The standard New Zealand Meteorological Service rain-gauge has a funnel diameter of 12.7 cm and is installed with the rim 30 cm above ground. Rainfall is measured to 0.1 mm.

Highest monthly/annual total: The highest rainfall recorded during the period indicated.

Normal: The normal refers to the standard 30 year period 1941-70, and is the average rainfall over this period. Since the observations are not complete over this period, the normal is obtained by adjusting the actual rainfall recorded to the standard 1941-70. This is done by comparing the actual rainfall at the station with the rainfall at nearby stations for which a true 1941-70 normal is available.

Lowest monthly/annual total: The lowest rainfall recorded during the period indicated.

Average number of days with rain: The average number of days (9 a.m. to 9 a.m.) during which at least 1.0 mm of rain was recorded.

(b) Temperatures

Dry bulb, maximum and minimum thermometers are exposed in screens 1.3 metres above a grassed surface.

Mean monthly/annual maximum: The average of the highest temperature recorded in each month or year during the period indicated.

Mean daily maximum: The average of the highest temperature recorded each day during the period indicated. This is approximately the average afternoon temperature.

Normal: The normal refers to the standard 30 year period 1941-70, and is obtained by averaging the mean daily maximum and mean daily minimum temperature for this period. As observations started after 1941, the normal is obtained by adjusting the actual temperatures to the standard 1941-70 period. This is done by comparing the actual temperature with the temperature at nearby stations for which a true 1941-70 normal is available.

Mean daily minimum: The average of the lowest temperature recorded each day during the period indicated. This is approximately the average early-morning temperature.

Mean monthly/annual minimum: The average of the lowest temperature recorded in each month or year during the period indicated.

(c) Wind Gusts

From Munro recording anemometer records, the average number of days in the month or year with gusts over 33 knots and over 51 knots are obtained.

(d) Special Phenomena

The frequency of special phenomena is given as the average number of days per month or year on which they are observed. Data given are the average number of days per month or year over the period indicated of snow, hail, thunder and fog.

(e) Pressure (QNH)

The barometers are the Kew Pattern type. QNH is calculated from the barometer readings corrected for temperature and height above mean sea level.

Mean monthly/annual QNH: The average of the 9 a.m. QNH values recorded for each month/year during the period indicated. The mean 9 a.m. QNH pressure is approximately 0.6 millibars higher than the mean daily QNH.

Mean monthly/annual minimum QNH: The average of the lowest QNH values recorded in each month or year during the period indicated.

2. Surface Winds

The prevailing wind directions at Christchurch International Airport are northeasterly (19.9 percent of the time), easterly (17.8 percent) and southwesterly (16.8 percent) (Fig. 3). Winds from other directions are not as frequent, but the northwesterly because of its hot dry character is important particularly on the afternoons and evenings of spring when its frequency of occurrence is as much as 13 percent. In Table 2 seasonal wind frequencies are given.

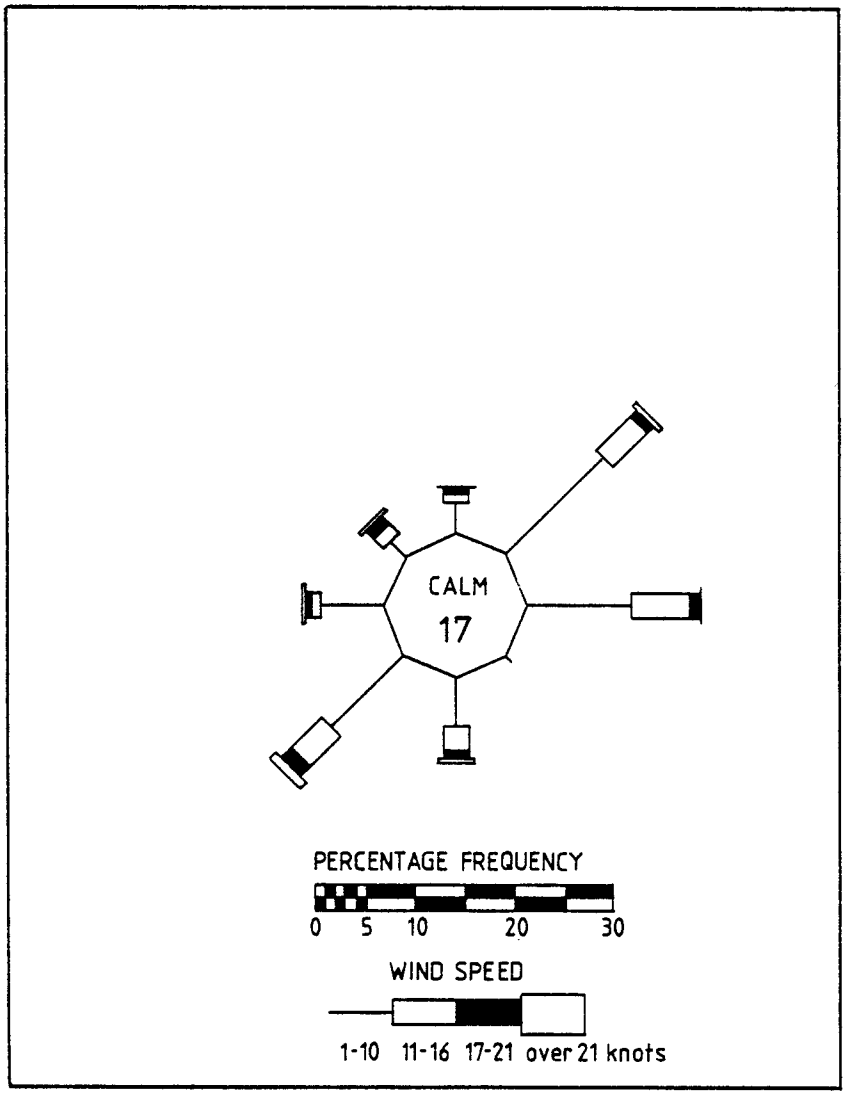

FIG 3 MEAN ANNUAL WIND FREQUENCIES (%) OF SURFACE WIND DIRECTIONS AT CHRISTCHURCH INTERNATIONAL AIRPORT
1960-1978
Frequencies found from hourly observations.

This table shows that the northeast to east winds are most frequent in summer and least during winter, while for southwesterly winds the highest frequencies occur during winter and the least in summer.

Strong winds (more than 20 knots) blow for about 2.8 percent of the time. Forty percent of the strong winds are from the south or southwest. They are often squalls which accompany cold fronts and are short lived. However, in the afternoon in spring and summer strong winds are about three times as frequent as the average. Half of the springtime strong winds are northwesterlies and, on summer afternoons, a natural northeasterly is often strengthend by a sea breeze component.

Commercial aircraft operations are seldom restricted by crosswinds. A crosswind is the component of the wind blowing perpendicular to the runway. The runway is considered to be unsafe for use by aircraft when the crosswind component exceeds a critical value depending on the type of aircraft. Ninety-four percent of cross-winds on the main runway, 02/20, are less than 11 knots, while with runway 29/11 the value is 82 percent. An analysis of crosswinds at the airport is given in Table 3 for runway 02/20 for wet and dry runway categories. (The runway is assumed wet if the rainfall in the preceding hour is at least 1.0 mm). The frequency of a crosswind in excess of 15 knots on both runways at the same time is less than 0.5 percent of the time. The highest frequency of crosswinds over 25 knots on runway 02/20 occurring during the spring results from the strong northwesterlies of that season.

The presence of the Southern Alps some 100 km to the west of the airfield causes very marked deviations from the gradient level (i.e., about 900 m or 3000 ft in coastal areas) wind direction throughout the whole of coastal Canterbury. Banks Peninsula and the Port Hills produce further local variations near Christchurch Airport.

When the gradient level flow is in the sector north-north-west through north to east, the surface wind at Christchurch will normally be northeast to east. Such a situation occurs when anticyclones are centred east or southeast of Canterbury, or even northeast with a ridge of high pressure extending over Otago or Southland. If, however, there is also a depression in the vicinity of the North Island the surface wind at the airport may be a light south-westerly especially when the pressure at Christchurch is at least 2 or 3 millibars higher than at Cape Campbell. At the same time the pressure gradient between Christchurch and Dunedin is weak.

In gradient flows between west and north-northwest with the upper level winds up to about 25 knots, a "forced northeasterly" normally exists at the airport.

If the west to north-northwest gradient wind increases, as happens when a cold front or trough of low pressure approaches the South Island, the northwesterly winds aloft may reach the surface and replace the northeasterly. The trend of the north-south (Cape Campbell minus Dunedin) and east-west (Hokitika minus Christchurch) pressure differences gives some guidance in forecasting northwesterlies at Christchurch. If the pressure difference Cape Campbell minus Dunedin (CC-DN) exceeds about 4 millibars, and at the same time Hokitika minus Christchurch (HK-CH) is greater than 5 millibars in unstable conditions, or about 10 millibars in very stable conditions, the surface wind at Christchurch is normally northwest. However, for smaller values of CC-DN or HK-CH, the likelihood of northwesterly winds diminishes.

On occasions when the flow is west-southwest, and a cold front is advancing over the South Island, the surface wind usually turns northwest ahead of the front. Under such conditions the pressure difference Christchurch minus Dunedin is normally small or even negative. Furthermore, a west or northwest wind will occur in moderate west-southwest gradients, and even under stable conditions.

With gradient winds between south-southeast and southwest the airport wind is nearly always southwest. If the pressure at Christchurch is at least 2 millibars lower than the pressure at Dunedin, the surface wind may exceed 20 knots. However, it is not likely to remain strong for more than 30 to 60 minutes unless a deep depression is centred not far to the east or southeast of Canterbury.

3. Sea and Land Breezes

(a) Sea Breeze

A sea breeze is a very common occurrence at Christchurch Airport when the pressure gradient is weak, especially in the period October-March. The direction of the sea breeze is from the east-northeast and the typical speed attained 15 knots. The sea breeze becomes noticeable 3-4 hours after sunrise and ends 1-2 hours after sunset. When forced northeasterly conditions prevail the sea breeze becomes masked, and the usual daily variation in wind will not take place. However, it is more likely that the effect of the sea breeze will be to increase the strength of the forced northeasterly during the warmer part of the day.

(b) Land Breeze

On clear nights with little pressure gradient a very light west-northwest katabatic drift down the plains is usual 1-2 hours after the sea breeze has died out.

4. Turbulence

Some turbulence is experienced at the airport in the hot northwesterlies and when a cold front arrives with a strong southerly squall. The intensity of the turbulence is seldom sufficient to affect the operation of aircraft except, briefly, light aircraft.

The most significant turbulence occurs immediately prior to the onset of a northwesterly in a zone of very strong low-level shear between the northwesterly aloft and the easterly on the ground. This condition seldom lasts long. Violent convective activity is not common but some very severe hailstorms have occurred in the vicinity.

5. Fog

Fog is reported at the airport on an average of 44 days each year, occurring most often during the period autumn to early spring. Those which occur during winter tend to persist longer than at other times of the year.

Most fogs at the airport are the result of radiation cooling on clear calm nights. Generally the windspeed must be less than 4 knots for fog to form on the runways, but fog patches may occur over neighbouring grassed areas with wind speeds as high as 8 knots. In most cases the wind direction will change from northeast to a very light northwest drift immediately before fog formation.

Fog that forms in the evening often lifts or clears by midnight, but may form again before dawn. Despite the amount of smoke in the air in winter, radiation fogs seldom if ever form when the relative humidity is appreciably below 100 percent. Sea fog or very low stratus from Pegasus Bay and fog that has formed over the Waimakariri River may be advected over the field, but it usually lifts clear of the ground as it does so. Fog advected from the Lake Ellesmere area to the south of the airport, although uncommon, is less likely to lift off the ground.

6. Visibility and Low Cloud

(a) Visibility

Poor visibility at the airport, apart from being caused by fog and heavy or dense precipitation, may be reduced by smoke haze in stable anti-cyclonic conditions, especially in the months April to September. The peak hours for smoke concentration over the city are 0600 to 1000 hours and 1600 to 2000 hours, and visibility at the

airport is most reduced when a light easterly drift carries the smoke towards the field. The visibility seldom, however, falls below 2000 m.

(b) Low Cloud

With the lack of obstruction on the approach and take off paths coupled with the use of electronic landing aids, the operation of commercial aircraft is rarely disrupted by the presence of low cloud. Low cloud in amounts greater than 4 oktas is usually associated with one of the following types of meteorological situation:

(i) A ridge of high pressure to the east and southeast of Christchurch with a northeast flow over the sea and, usually northeast to east surface winds at the airport. (This situation may also be associated with light southwesterlies).

Stratus may form over the sea and move inland from the Pegasus Bay area. Generally the base of the stratus at the airport is above 800 ft (240 m) but it can be lower, particularly in the evening and early morning when it may be down to 300 ft (90 m) or occasionally lower. However even when the ceiling is zero over the sea it generally slopes upwards over the land and is rarely below 200 ft (60 m) over the airport.

Drizzle is often experienced when the cloud base is below about 650 ft (200 m). Occasionnally there is some vertical development in the cloud leading to wide fluctuations in the intensity of the drizzle, almost of a showery nature but still with small droplets. Drizzle is likely to persist so long as there is no northwest flow aloft below about 3000 ft (900 m) and the low cloud may persist until the northwest flow reaches about 1500 ft (450 m).

In the appendix are forecasting rules derived by Smith (1974) on the persistence of cloudiness over Christchurch and the Plains in anticyclonic conditions.

(ii) A depression not far east or northeast of Canterbury.

In this situation the wind at the airport is usually south or southwest, although the airflow out to sea is southeasterly. The ceiling at the airport will normally be above

1500 ft (450 m, but scattered low stratus may drift across the approach areas at times. In this situation the airport is sheltered by Banks Peninsula and much lower ceilings will exist to the northeast and southwest. The lowest cloud in these conditions is likely to be in the region between Rolleston and Rakaia.

(iii) Following the passage of a cold front when the wind is southwest.

The cloud ceiling is generally above 800 ft (240 m) and only very occasionally below 300 ft (90 m). Restrictions on aircraft operations under such conditions are usually short lived.

In situations where the gradient flow is from the northeast or from the southeast, the cloud base is normally lower over the sea than over the airport during the day. There is also a tendency for the cloud base to be lower near the Port Hills and around Wigram Military Airport than at Christchurch Airport.

In a "dying southerly" the stratocumulus cover may slope from 1650-2500 ft (500-800 m) near the hills to the southeast, to 3000-4000 ft (900-1200 m) or higher near the foothills to the west.

(c) Joint Occurrences of Low Cloud and/or poor Visibility

Tables 4 to 7 present the frequency distribution by seasons of selected low cloud and/or poor visibility conditions as a function of wind speed and direction together with the corresponding wind summary.

The likelihood of low cloud and/or poor visibility occurring simultaneously for specified wind speed and direction is given in tables of joint probability (Tables 8 to 11). For a given wind speed and direction, the joint probability is defined as, the ratio of the number of occurrences of reduced ceiling and/or visibility (Tables 4a-c, 5a-c, 6a-c, 7a-c) to the total number of observations (Tables 4d, 5d, 6d, 7d) for the same wind speed and direction.

Some points to note from these tables are:

(i) The almost complete absence of low cloud/poor visibility in all seasons from the southeasterly quarter and from the northwesterly quarter.

(ii) Low cloud and/or poor visibility is likely to occur when the wind is between 060° and 090°, and between 200° and 230° at wind speeds less than 20 knots.

(iii) With wind speeds over 20 knots almost all the occurrences of low cloud and/or poor visibility are to be found in the south to southwest wind directions.

The diurnal and monthly variations in the frequencies of specified ceiling bases and/or visibility ranges are displayed in Table 12. The table shows the months May to September as having the highest frequencies of adverse flying conditions. In June, July and August there is a slight diurnal variation in the frequency of occurrences but in most other months, especially October to March, poor conditions are rare in the daytime.

7. Precipitation

Very heavy precipitation is rare at Christchurch and aircraft operation is almost never restricted by heavy precipitation alone. Reduction of visibility by drizzle is reasonably common, but nearly always these conditions are accompanied by low cloud.

Snow, hail and thunder are rare occurrences at the airfield. Snow seldom lies on the runway for long enough to seriously disrupt flying operations.

Reference:

Smith, R.M, 1974: The persistence of cloudiness over Canterbury in anticyclonic conditions. Unpub. N.Z. Met.S. Rep.

TABLE 1. AIRPORT CLIMATOLOGICAL SUMMARY

CHRISTCHURCH AIRPORT LAT. 43 29S LONG. 172 32E HT. 30 M.

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
RAINFALL. MILLIMETRES														
HIGHEST MONTHLY/ANNUAL TOTAL	1943-1979	110	144	173	199	198	168	181	149	120	137	140	149	987
NORMAL	1941-1970	46	43	53	56	81	56	61	53	43	43	43	48	626
LOWEST MONTHLY/ANNUAL TOTAL	1943-1979	8	5	3	11	13	5	5	5	5	3	8	5	382
AVERAGE NUMBER OF DAYS WITH RAIN 1.0 MILLIMETRES OR MORE	1945-1979	6	5	7	6	9	8	9	7	6	7	6	7	83
TEMPERATURE. DEGREES CELSIUS														
MEAN MONTHLY/ANNUAL MAXIMUM	1953-1979	32.1	31.8	29.2	25.9	21.2	17.9	17.2	19.5	21.6	25.3	27.7	30.0	33.4
MEAN DAILY MAXIMUM	1953-1979	22.0	21.9	19.9	17.3	13.8	11.1	10.4	11.9	14.2	16.8	19.2	20.6	16.6
NORMAL	1941-1970	16.6	16.5	14.6	11.7	8.7	5.9	5.4	6.7	9.1	11.5	13.8	15.2	11.3
MEAN DAILY MINIMUM	1953-1979	12.0	11.7	10.4	7.1	3.9	1.1	0.8	2.0	4.2	6.4	8.5	10.7	6.6
MEAN MONTHLY/ANNUAL MINIMUM	1953-1979	6.2	5.9	3.7	0.8	-2.0	-4.0	-4.3	-3.2	-1.6	0.1	2.3	4.9	-4.6
WIND														
AVERAGE NO. OF DAYS WITH														
GUSTS 34 KNOTS OR MORE	1954-1979	5.8	4.3	4.3	4.2	4.3	3.4	2.7	2.9	4.0	5.4	6.1	4.3	51.7
GUSTS 52 KNOTS OR MORE	1954-1979	.	0.1	0.3	0.3	0.5	0.2	0.3	0.1	0.2	0.3	0.3	0.2	2.8
SPECIAL PHENOMENA														
AVERAGE NO. OF DAYS WITH SNOW	1972-1979	.	.	.	.	.	1.4	0.9	0.6	0.5	.	0.1	.	3.5
AVERAGE NO. OF DAYS WITH HAIL	1971-1979	0.1	0.3	0.3	0.3	0.3	0.8	0.8	0.7	0.8	0.9	0.7	0.4	6.4
AVERAGE NO. OF DAYS WITH THUNDER	1955-1979	0.4	0.2	0.2	0.1	.	.	.	.	0.2	0.3	0.4	0.4	2.2
AVERAGE NO. OF DAYS WITH FOG	1971-1979	1.1	2.0	3.3	4.0	4.2	5.4	7.8	5.3	3.8	3.0	2.0	1.9	43.8
PRESSURE. MILLIBARS														
MEAN MONTHLY/ANNUAL. QNH.	1954-1979	1013	1015	1016	1015	1013	1013	1014	1014	1014	1012	1011	1011	1013
MEAN MONTHLY/ANNUAL MINIMUM. QNH	1960-1979	992	995	994	998	990	990	987	988	987	989	989	990	987

TABLE 2: SEASONAL FREQUENCY PER THOUSAND OBSERVATIONS OF WINDS FOR SPECIFIED DIRECTION AND SPEED CATEGORIES AT CHRISTCHURCH INTERNATIONAL AIRPORT PERIOD 1960 - 1978.

Note: A zero indicates occurrences <0.5, a blank indicates no occurences.

SPRING (Sep, Oct, Nov)

SPEED (KT) DIR	1-3	4-10	11-16	17-21	22-27	28+	TOTAL
N	8	32	12	5	2	0	59
NE	18	123	54	10	1	0	206
E	10	108	70	10	1	0	199
SE	3	8	1	0	0		12
S	5	44	28	9	3	0	89
SW	9	78	43	13	5	1	149
W	8	40	13	4	2	1	67
NW	4	25	25	15	10	3	82
CALM							137
TOTAL	65	458	246	65	24	5	
TOTAL OBSERVATIONS USED							41268

SUMMER (Dec, Jan, Feb)

SPEED (KT) DIR	1-3	4-10	11-16	17-21	22-27	28+	TOTAL
N	7	21	9	3	1	0	41
NE	16	128	69	14	2	0	229
E	9	112	103	25	3	0	253
SE	3	8	1	0			12
S	5	50	36	9	2	0	104
SW	9	76	43	11	4	1	143
W	7	29	9	2	1	0	48
NW	4	15	17	12	6	2	56
CALM							115
TOTAL	59	439	286	77	20	3	
TOTAL OBSERVATIONS USED							40914

AUTUMN (Mar, Apr, May)

SPEED (KT) DIR	1-3	4-10	11-16	17-21	22-27	28+	TOTAL
N	11	29	8	3	1	0	52
NE	22	132	47	7	1	0	209
E	11	100	44	5	1	0	162
SE	3	6	1	0	0	0	10
S	7	43	23	6	2	1	82
SW	12	88	45	13	5	2	164
W	11	55	12	2	1	1	83
NW	6	18	13	7	3	1	49
CALM							190
TOTAL	83	471	193	43	14	5	
TOTAL OBSERVATIONS USED							41750

WINTER (Jun, Jul, Aug)

SPEED (KT) DIR	1-3	4-10	11-16	17-21	22-27	28+	TOTAL
N	11	30	6	2	1	0	50
NE	20	101	26	4	1	0	153
E	10	68	18	2	1	0	98
SE	3	4	1	0	0		7
S	9	37	14	4	1	0	64
SW	18	117	52	16	7	2	214
W	18	92	17	3	1	0	131
NW	8	20	10	3	1	1	43
CALM							239
TOTAL	96	469	144	35	14	4	
TOTAL OBSERVATIONS USED							41761

TABLE 3. NZ METEOROLOGICAL SERVICE UNITS. RAINFALL.MILLIMETRES.

AIRPORT RUNWAY CROSSWIND ANALYSIS COMPONENTS.KNOTS

CHRISTCHURCH RUNWAY 40/220 T

DATA PERIOD 1 1960 TO 12 1979 HOURS 0 TO 23 NZST

CROSSWINDS(NR. OF OCCASIONS)

	HOURLY RAINFALL	CALMS	0-5	6-10	11-13	14-15	16-17	18-20	21-25	26-30	>30	TOTAL	TOTAL OBS.USED
JAN	0 - 0.9	1526	7559	3171	699	234	175	180	153	38	8	13743	
	> 0.9	19	196	62	12	2	4	3	0	0	0	298	14041
FEB	0 - 0.9	1658	7373	2719	366	139	79	103	73	21	3	12534	
	> 0.9	20	169	47	7	0	2	1	0	0	0	246	12780
MAR	0 - 0.9	2122	8367	2491	348	126	74	104	65	37	6	13740	
	> 0.9	13	217	66	11	6	2	1	2	0	0	318	14058
APR	0 - 0.9	2822	8427	2050	267	130	72	81	76	16	1	13942	
	> 0.9	27	255	71	14	5	4	7	8	0	4	395	14337
MAY	0 - 0.9	3323	8762	1803	214	105	65	62	34	14	3	14385	
	> 0.9	27	278	80	18	9	0	2	6	0	0	420	14805
JUN	0 - 0.9	3887	8347	1423	137	73	32	50	18	9	7	13983	
	> 0.9	29	231	80	14	5	2	1	1	0	0	363	14346
JUL	0 - 0.9	3432	8846	1703	184	63	35	26	27	8	1	14325	
	> 0.9	25	282	107	31	11	11	5	3	0	0	475	14800
AUG	0 - 0.9	3174	8881	1810	242	92	67	52	27	13	3	14361	
	> 0.9	20	291	105	14	2	1	0	0	0	2	435	14796
SEP	0 - 0.9	2043	8437	2599	395	161	133	110	105	47	3	14033	
	> 0.9	7	191	85	17	3	1	0	0	0	0	304	14337
OCT	0 - 0.9	2062	8210	2884	495	203	148	224	167	67	11	14471	
	> 0.9	33	198	73	7	1	1	4	0	0	0	317	14788
NOV	0 - 0.9	1799	7511	3090	625	282	180	227	193	51	13	13971	
	> 0.9	14	218	86	14	1	0	0	1	0	0	334	14305
DEC	0 - 0.9	1549	7996	3481	730	246	154	162	125	40	8	14491	
	> 0.9	5	210	90	8	1	3	1	0	0	0	318	14809
YEAR	0 - 0.9	29397	98716	29224	4702	1854	1214	1381	1063	361	67	167979	
	> 0.9	239	2736	952	167	46	31	25	21	0	6	4223	172202

CHRISTCHURCH AIRPORT — PERIOD JANUARY 1960 - DECEMBER 1979

WIND SUMMARY IN CONDITIONS OF REDUCED CEILING AND VISIBILITY

SUMMER SEASON (DEC JAN FEB) — TOTAL OBSERVATIONS USED 43 312

TABLE 4A — CRITERIA (CLOUD MORE THAN 4/8 BELOW 1500 FEET) (VISIBILITY LESS THAN 5000 METRES) EITHER OR BOTH

DIR IN 10 DEGREES / SPEED IN KNOTS	36-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	CALM	TOTAL
1 - 5	38	81	95	180	108	29	15	10	11	38	64	65	52	28	10	8	4	16		852
6 - 10	15	52	238	684	300	47	13	3	9	76	260	235	113	31	1	2		4		2083
11 - 15		2	82	547	312	23	2		5	67	274	254	102	12				1		1683
16 - 20			5	154	115	12	1		2	27	110	112	46	1						585
21 - 25				20	10	2				7	24	44	4		1					112
26 - 30				1					1	2	4	8	3							19
31 - 35										1		5								6
36 - 40																				
OVER 40																				
TOTAL	53	135	420	1586	845	113	31	13	28	218	736	723	320	72	12	10	4	21	561	5901

TABLE 4B — CRITERIA (CLOUD MORE THAN 4/8 BELOW 700 FEET) (VISIBILITY LESS THAN 2000 METRES) EITHER OR BOTH

1 - 5	20	37	50	66	49	7	2	4	2	11	28	31	23	15	4	3	1	9		362
6 - 10	2	20	89	204	84	17	4	1	2	20	105	85	31	11		1		1		677
11 - 15			13	132	74	5	1			21	96	86	26	2						456
16 - 20			1	14	11	7				4	19	24	11	1						92
21 - 25						1				2	5	7			1					16
26 - 30											1	1								2
31 - 35																				
36 - 40																				
OVER 40																				
TOTAL	22	57	153	416	218	37	7	5	4	58	254	234	91	29	5	4	1	10	261	1866

TABLE 4C — CRITERIA (CLOUD MORE THAN 4/8 BELOW 300 FEET) (VISIBILITY LESS THAN 1000 METRES) EITHER OR BOTH

1 - 5	9	18	16	21	5		1	1		3	10	13	12	5	3	1	1	7		126
6 - 10	1	3	26	39	8	2				1	18	13	6							117
11 - 15			1	10	10						3	5								29
16 - 20				1																1
21 - 25															1					1
26 - 30																				
31 - 35																				
36 - 40																				
OVER 40																				
TOTAL	10	21	43	71	23	2	1	1		4	31	31	18	5	4	1	1	7	137	411

TABLE 4D — WIND SUMMARY (ALL OBSERVATIONS)

1 - 5	322	684	794	1170	686	195	144	93	150	409	536	418	488	369	203	164	142	167		7134
6 - 10	239	633	1476	3577	2125	390	77	66	271	936	1354	1007	835	446	177	222	212	180		14223
11 - 15	165	197	706	3232	2322	248	20	5	169	837	1065	681	398	95	122	300	303	168		11033
16 - 20	51	59	150	1171	872	71	6	1	34	299	461	288	117	28	101	378	262	129		4478
21 - 25	11	8	22	203	119	6			3	76	122	74	20	11	36	165	130	32		1038
26 - 30	3	3	3	13	4	1			6	16	26	18	5	6	23	58	30	11		226
31 - 35				1						5	1	6			5	10	7			35
36 - 40											1				1	2	1			5
OVER 40																				
TOTAL	791	1584	3151	9367	6128	911	247	165	633	2578	3566	2492	1863	955	668	1299	1087	687	5140	43312

CHRISTCHURCH AIRPORT PERIOD JANUARY 1960 - DECEMBER 1979

WIND SUMMARY IN CONDITIONS OF REDUCED CEILING AND VISIBILITY

AUTUMN SEASON (MAR APR MAY) TOTAL OBSERVATIONS USED 44 155

TABLE 5A CRITERIA (CLOUD MORE THAN 4/8 BELOW 1500 FEET) (VISIBILITY LESS THAN 5000 METRES) EITHER OR BOTH

DIR IN 10 DEGREES / SPEED IN KNOTS	36-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	CALM	TOTAL
1 - 5	64	125	146	162	126	34	19	2	16	63	125	108	98	56	25	25	30	28		1252
6 - 10	23	49	239	592	274	42	26	4	10	63	279	372	260	49	12	2	4	6		2306
11 - 15		4	71	350	185	32	6			50	219	260	217	28		2	2	1		1427
16 - 20			13	41	39	6	1			30	105	95	64	5						399
21 - 25			7		1	6	2			8	29	34	8	2	1					98
26 - 30					1	1				2	15	10	8	5						42
31 - 35							1			3		10	7	4						25
36 - 40											1	6	2	1						10
OVER 40												1	5	2						8
TOTAL	87	178	476	1145	626	121	55	6	26	219	773	896	669	152	38	29	36	35	1144	6711

TABLE 5B CRITERIA (CLOUD MORE THAN 4/8 BELOW 700 FEET) (VISIBILITY LESS THAN 2000 METRES) EITHER OR BOTH

1 - 5	37	66	81	85	40	13	12		5	29	69	69	54	32	18	20	24	22		676
6 - 10	7	25	111	235	98	30	15	1	5	16	127	185	123	22	5		1	2		1008
11 - 15		2	22	111	69	12	4			20	82	107	91	10						530
16 - 20			3	10	16	4	1			7	47	47	14							149
21 - 25					1	4	1				5	15	3	1						30
26 - 30					1	1					3	2	7							14
31 - 35										2		1	5							8
36 - 40													2							2
OVER 40													5							5
TOTAL	44	93	217	441	225	64	33	1	10	74	333	426	304	65	23	20	25	24	751	3173

TABLE 5C CRITERIA (CLOUD MORE THAN 4/8 BELOW 300 FEET) (VISIBILITY LESS THAN 1000 METRES) EITHER OR BOTH

1 - 5	22	34	29	31	7	2	3			9	27	29	26	12	10	9	22	14		286
6 - 10	2	13	31	64	13	1			1	3	32	50	24	1				1		236
11 - 15			1	14	10						6	9	7							47
16 - 20					3						1	1								5
21 - 25																				
26 - 30																				
31 - 35																				
36 - 40																				
OVER 40																				
TOTAL	24	47	61	109	33	3	3		1	12	66	89	57	13	10	9	22	15	488	1062

TABLE 5D WIND SUMMARY (ALL OBSERVATIONS)

1 - 5	485	991	1057	1294	816	238	126	80	165	450	655	525	720	677	349	277	203	240		9348
6 - 10	314	758	1544	3177	1898	294	84	37	165	781	1343	1203	1318	885	422	233	216	224		14896
11 - 15	139	228	656	1839	1002	111	16	1	63	538	906	757	680	189	105	217	255	133		7835
16 - 20	61	60	157	394	194	10	2		11	189	420	297	187	33	76	187	156	80		2514
21 - 25	14	10	38	38	9	6	2		3	32	128	108	38	11	29	60	71	25		622
26 - 30	2	1	2	7	2	1			1	16	48	45	20	9	16	19	33	15		237
31 - 35							1			4	12	22	11	6	2	1	6	3		68
36 - 40										1	4	8	2	1			2	1		19
OVER 40												1	5	4						10
TOTAL	1015	2048	3454	6749	3921	660	231	118	408	2011	3516	2966	2981	1815	999	994	942	721	8606	44155

CHRISTCHURCH AIRPORT — PERIOD JANUARY 1960 - DECEMBER 1979

WIND SUMMARY IN CONDITIONS OF REDUCED CEILING AND VISIBILITY

WINTER SEASON (JUN JUL AUG) — TOTAL OBSERVATIONS USED 44 154

TABLE 6A — CRITERIA (CLOUD MORE THAN 4/8 BELOW 1500 FEET) (VISIBILITY LESS THAN 5000 METRES) — EITHER OR BOTH

DIR IN 10 DEGREES / SPEED IN KNOTS	36-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	CALM	TOTAL
1 - 5	102	136	115	111	72	27	12	8	11	62	184	198	212	160	42	26	24	38		1540
6 - 10	19	88	156	284	130	37	7	1	11	65	321	482	417	122	19	3	2	9		2173
11 - 15	1	6	39	176	69	27	16		1	44	225	273	319	32	1					1229
16 - 20		1	29	30	23	27	5			47	115	121	177	6		1				582
21 - 25			6	17	6	7	4			15	45	51	57	3						211
26 - 30			1	7	1		1				9	36	18							73
31 - 35			2	2	1						1	15	1							22
36 - 40											1	6	3							10
OVER 40												2								2
TOTAL	122	231	348	627	302	125	45	9	23	233	901	1184	1204	323	62	30	26	47	1480	7322

TABLE 6B — CRITERIA (CLOUD MORE THAN 4/8 BELOW 700 FEET) (VISIBILITY LESS THAN 2000 METRES) — EITHER OR BOTH

1 - 5	68	87	65	55	34	14	6	2	5	34	106	121	129	98	28	16	18	31		917
6 - 10	7	58	96	154	73	18	4		5	32	190	290	224	62	8	3	1	5		1230
11 - 15			10	74	32	13	9		1	22	110	131	134	8						544
16 - 20			3	8	9	14	3			17	50	47	79	1						231
21 - 25				6	3	2	3			4	21	16	21	1						77
26 - 30				4	1		1				2	7	3							18
31 - 35					1							1								2
36 - 40																				
OVER 40																				
TOTAL	75	145	174	301	153	61	26	2	11	109	479	613	590	170	36	19	19	36	988	4007

TABLE 6C — CRITERIA (CLOUD MORE THAN 4/8 BELOW 300 FEET) (VISIBILITY LESS THAN 1000 METRES) — EITHER OR BOTH

1 - 5	47	57	40	33	12	3		1	3	16	44	58	68	49	15	13	12	24		495
6 - 10	5	42	41	77	27	4			2	7	57	73	61	17	5	2	1	4		425
11 - 15				22	9	3				3	6	13	12							68
16 - 20			1	1							2		5							9
21 - 25				2																2
26 - 30																				
31 - 35																				
36 - 40																				
OVER 40																				
TOTAL	52	99	82	135	48	10		1	5	26	109	144	146	66	20	15	13	28	670	1669

TABLE 6D — WIND SUMMARY (ALL OBSERVATIONS)

1 - 5	517	921	960	1090	686	179	92	74	144	475	881	816	1167	1115	553	320	264	301		10555
6 - 10	319	707	1198	2032	1245	220	42	25	135	554	1327	1540	1987	1616	512	265	204	242		14170
11 - 15	114	184	423	827	399	63	17	2	27	264	779	844	982	263	131	205	152	104		5780
16 - 20	33	52	123	140	55	32	5		4	139	346	397	412	39	37	109	68	38		2029
21 - 25	8	4	42	33	6	7	5		2	33	113	147	96	10	12	17	29	17		581
26 - 30	3		11	8	1		1			3	21	75	28	3	7	16	14	7		198
31 - 35			3	5	1						7	21	6	1		3	2	1		50
36 - 40											1	7	7			1	2			18
OVER 40												2			2	2	2			8
TOTAL	994	1868	2760	4135	2393	501	162	101	312	1468	3475	3849	4685	3047	1254	938	737	710	10765	44154

CHRISTCHURCH AIRPORT

PERIOD JANUARY 1960 - DECEMBER 1979

WIND SUMMARY IN CONDITIONS OF REDUCED CEILING AND VISIBILITY

SPRING SEASON (SEP OCT NOV)

TOTAL OBSERVATIONS USED 43 671

TABLE 7A — CRITERIA (CLOUD (MORE THAN 4/8 BELOW 1500 FEET) (VISIBILITY LESS THAN 5000 METRES) EITHER OR BOTH

DIR IN 10 DEGREES / SPEED IN KNOTS	36-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	CALM	TOTAL
1 - 5	65	99	106	139	76	24	11	7	13	32	71	78	81	44	14	10	17	24		911
6 - 10	22	46	169	490	261	34	8	2	9	87	221	243	173	39	3	3	1			1811
11 - 15	1	7	52	388	223	26	2		5	74	210	224	151	19	5					1387
16 - 20		2	11	75	53	5				36	120	122	45	3						472
21 - 25		1		8	3				1	11	34	31	17	1						107
26 - 30				1						5	5	9	1							21
31 - 35											1		1							2
36 - 40																				
OVER 40																				
TOTAL	88	155	338	1101	616	89	21	9	28	245	662	707	469	106	22	13	18	24	702	5413

TABLE 7B — CRITERIA (CLOUD (MORE THAN 4/8 BELOW 700 FEET) (VISIBILITY LESS THAN 2000 METRES) EITHER OR BOTH

1 - 5	49	58	69	54	39	11	5	2	5	12	38	43	37	23	7	7	13	16		488
6 - 10	9	26	79	209	86	12	5		1	22	95	122	60	16	2					744
11 - 15	1	1	17	112	56	10	2		1	22	70	87	49	5						433
16 - 20		1	4	12	14					7	37	48	21							144
21 - 25				1						1	4	13	9	1						29
26 - 30													1							1
31 - 35																				
36 - 40																				
OVER 40																				
TOTAL	59	86	169	388	195	33	12	2	7	64	244	313	177	45	9	7	13	16	442	2281

TABLE 7C — CRITERIA (CLOUD (MORE THAN 4/8 BELOW 300 FEET) (VISIBILITY LESS THAN 1000 METRES) EITHER OR BOTH

1 - 5	33	38	43	28	12	2		1	4	6	16	15	12	9	3	2	7	11		242
6 - 10	3	12	27	70	15	2				6	29	31	16	5	2					218
11 - 15			5	10	1						4	15	2							37
16 - 20					1						1									2
21 - 25												1	1							2
26 - 30																				
31 - 35																				
36 - 40																				
OVER 40																				
TOTAL	36	50	75	108	29	4		1	4	12	50	62	31	14	5	2	7	11	277	778

TABLE 7D — WIND SUMMARY (ALL OBSERVATIONS)

1 - 5	420	780	865	1139	795	232	127	97	145	311	515	445	569	466	267	227	202	245		7847
6 - 10	388	704	1487	3082	2158	361	105	49	222	859	1292	1032	993	650	290	376	339	331		14718
11 - 15	172	253	690	2297	1596	210	10	8	115	617	991	701	534	156	209	450	389	266		9664
16 - 20	81	76	167	679	385	42		2	29	304	502	337	162	37	144	453	286	137		3823
21 - 25	15	13	12	66	33				6	77	160	93	34	20	81	229	126	60		1025
26 - 30	3		2	5	2				1	23	51	36	9	6	31	88	61	25		343
31 - 35										4	1	1	2	1	9	9	18	1		46
36 - 40												1	1				2			4
OVER 40											1						1			2
TOTAL	1079	1826	3223	7268	4969	845	242	156	518	2195	3513	2646	2304	1336	1031	1832	1424	1065	6199	43671

CHRISTCHURCH AIRPORT PERIOD JANUARY 1960 - DECEMBER 1979

JOINT PROBABILITIES IN CONDITIONS OF REDUCED CEILING AND VISIBILITY

NOTE: JOINT PROBABILITY (JP) IS THE PERCENTAGE OCCURRENCE OF REDUCED CEILING AND VISIBILITY FOR A PARTICULAR WIND CATEGORY. 0+ INDICATES A JP BETWEEN 0 AND 0.5.
REFERENCE SHOULD BE MADE TO TABLES 4A,B,C, OR D FOR ACTUAL OCCURRENCES ON WHICH PERCENTAGES ARE BASED.

SUMMER SEASON (DEC JAN FEB) TOTAL OBSERVATIONS USED 43 312

TABLE 8A CRITERIA (CLOUD MORE THAN 4/8 BELOW 1500 FEET) (VISIBILITY LESS THAN 5000 METRES) EITHER OR BOTH

DIR IN 10 DEGREES / SPEED IN KNOTS	36-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	CALM
1 - 5	12	12	12	15	16	15	10	11	7	9	12	16	11	8	5	5	3	10	
6 - 10	6	8	16	19	14	12	17	5	3	8	19	23	14	7	1	1		2	
11 - 15		1	12	17	13	9	10		3	8	26	37	26	13				1	
16 - 20			3	13	13	17	17		6	9	24	39	39	4					
21 - 25				10	8	33				9	20	59	20		3				
26 - 30				8					17	13	15	44	60						
31 - 35										20		83							
36 - 40																			
OVER 40																			
CALM																			11

TABLE 8B CRITERIA (CLOUD MORE THAN 4/8 BELOW 700 FEET) (VISIBILITY LESS THAN 2000 METRES) EITHER OR BOTH

1 - 5	6	5	6	6	7	4	1	4	1	3	5	7	5	4	2	2	1	5	
6 - 10	1	3	6	6	4	4	5	2	1	2	8	8	4	2		0+		1	
11 - 15			2	4	3	2	5			3	9	13	7	2					
16 - 20			1	1	1	10				1	4	8	9	4					
21 - 25						17				3	4	9			3				
26 - 30											4	6							
31 - 35																			
36 - 40																			
OVER 40																			
CALM																			5

TABLE 8C CRITERIA (CLOUD MORE THAN 4/8 BELOW 300 FEET) (VISIBILITY LESS THAN 1000 METRES) EITHER OR BOTH

1 - 5	3	3	2	2	1		1	1		1	2	3	2	1	1	1	1	4	
6 - 10	0+	0+	2	1	0+	1				0+	1	1	1						
11 - 15			0+	0+	0+						0+	1							
16 - 20				0+															
21 - 25															3				
26 - 30																			
31 - 35																			
36 - 40																			
OVER 40																			
CALM																			3

CHRISTCHURCH AIRPORT

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JOINT PROBABILITIES IN CONDITIONS OF REDUCED CEILING AND VISIBILITY

NOTE: JOINT PROBABILITY (JP) IS THE PERCENTAGE OCCURRENCE OF REDUCED CEILING AND VISIBILITY FOR A PARTICULAR WIND CATEGORY. 0+ INDICATES A JP BETWEEN 0 AND 0.5.
REFERENCE SHOULD BE MADE TO TABLES 5A,B,C, OR D FOR ACTUAL OCCURRENCES ON WHICH PERCENTAGES ARE BASED.

AUTUMN SEASON (MAR APR MAY)

TOTAL OBSERVATIONS USED 44 155

TABLE 9A — CRITERIA (CLOUD (MORE THAN 4/8 BELOW 1500 FEET) (VISIBILITY LESS THAN 5000 METRES) EITHER OR BOTH

DIR IN 10 DEGREES / SPEED IN KNOTS	36-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	CALM
1 - 5	13	13	14	13	15	14	15	3	10	14	19	21	14	8	7	9	15	12	
6 - 10	7	6	15	19	14	14	31	11	6	8	21	31	20	6	3	1	2	3	
11 - 15		2	11	19	18	29	38			9	24	34	32	15		1	1	1	
16 - 20			8	10	20	60	50			16	25	32	34	15					
21 - 25			18		11	100	100			25	23	31	21	18	3				
26 - 30					50	100				13	31	22	40	56					
31 - 35							100			75		45	64	67					
36 - 40											25	75	100	100					
OVER 40												100	100	50					
CALM																			13

TABLE 9B — CRITERIA (CLOUD (MORE THAN 4/8 BELOW 700 FEET) (VISIBILITY LESS THAN 2000 METRES) EITHER OR BOTH

1 - 5	8	7	8	7	5	5	10		3	6	11	13	8	5	5	7	12	9	
6 - 10	2	3	7	7	5	10	18	3	3	2	9	15	9	2	1		0+	1	
11 - 15		1	3	6	7	11	25			4	9	14	13	5					
16 - 20			2	3	8	40	50			4	11	16	7						
21 - 25					11	67	50				4	14	8	9					
26 - 30					50	100					6	4	35						
31 - 35										50		5	45						
36 - 40													100						
OVER 40													100						
CALM																			9

TABLE 9C — CRITERIA (CLOUD (MORE THAN 4/8 BELOW 300 FEET) (VISIBILITY LESS THAN 1000 METRES) EITHER OR BOTH

1 - 5	5	3	3	2	1	1	2			2	4	6	4	2	3	3	11	6	
6 - 10	1	2	2	2	1	0+			1	0+	2	4	2	0+				0+	
11 - 15			0+	1	1						1	1	1						
16 - 20					2						0+	0+							
21 - 25																			
26 - 30																			
31 - 35																			
36 - 40																			
OVER 40																			
CALM																			6

CHRISTCHURCH AIRPORT PERIOD JANUARY 1960 - DECEMBER 1979

JOINT PROBABILITIES IN CONDITIONS OF REDUCED CEILING AND VISIBILITY

NOTE: JOINT PROBABILITY (JP) IS THE PERCENTAGE OCCURRENCE OF REDUCED CEILING AND VISIBILITY FOR A PARTICULAR WIND CATEGORY. 0+ INDICATES A JP BETWEEN 0 AND 0.5.
REFERENCE SHOULD BE MADE TO TABLES 6A,B,C, OR D FOR ACTUAL OCCURRENCES ON WHICH PERCENTAGES ARE BASED.

WINTER SEASON (JUN JUL AUG) TOTAL OBSERVATIONS USED 44 154

TABLE 10A CRITERIA (CLOUD MORE THAN 4/8 BELOW 1500 FEET) (VISIBILITY LESS THAN 5000 METRES) EITHER OR BOTH

DIR IN 10 DEGREES / SPEED IN KNOTS	36-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	CALM
1 - 5	20	15	12	10	10	15	13	11	8	13	21	24	18	14	8	8	9	13	
6 - 10	6	12	13	14	10	17	17	4	8	12	24	31	21	8	4	1	1	4	
11 - 15	1	3	9	21	17	43	94		4	17	29	32	32	12	1				
16 - 20		2	24	21	42	84	100			34	33	30	43	15		1			
21 - 25			14	52	100	100	80			45	40	35	59	30					
26 - 30			9	88	100		100				43	48	64						
31 - 35			67	40	100						14	71	17						
36 - 40											100	86	43						
OVER 40												100							
CALM																			14

TABLE 10B CRITERIA (CLOUD MORE THAN 4/8 BELOW 700 FEET) (VISIBILITY LESS THAN 2000 METRES) EITHER OR BOTH

1 - 5	13	9	7	5	5	8	7	3	3	7	12	15	11	9	5	5	7	10	
6 - 10	2	8	8	8	6	8	10		4	6	14	19	11	4	2	1	0+	2	
11 - 15			2	9	8	21	53		4	8	14	16	14	3					
16 - 20			2	6	16	44	60			12	14	12	19	3					
21 - 25				18	50	29	60			12	19	11	22	10					
26 - 30				50	100		100				10	9	11						
31 - 35					100							5							
36 - 40																			
OVER 40																			
CALM																			9

TABLE 10C CRITERIA (CLOUD MORE THAN 4/8 BELOW 300 FEET) (VISIBILITY LESS THAN 1000 METRES) EITHER OR BOTH

1 - 5	9	6	4	3	2	2		1	2	3	5	7	6	4	3	4	5	8	
6 - 10	2	6	3	4	2	2			1	1	4	5	3	1	1	1	0+	2	
11 - 15				3	2	5				1	1	2	1						
16 - 20			1	1							1		1						
21 - 25				6															
26 - 30																			
31 - 35																			
36 - 40																			
OVER 40																			
CALM																			6

CHRISTCHURCH AIRPORT PERIOD JANUARY 1960 - DECEMBER 1979

JOINT PROBABILITIES IN CONDITIONS OF REDUCED CEILING AND VISIBILITY

NOTE: JOINT PROBABILITY (JP) IS THE PERCENTAGE OCCURRENCE OF REDUCED CEILING AND VISIBILITY FOR A PARTICULAR WIND CATEGORY. 0+ INDICATES A JP BETWEEN 0 AND 0.5.
REFERENCE SHOULD BE MADE TO TABLES 7A,B,C, OR D FOR ACTUAL OCCURRENCES ON WHICH PERCENTAGES ARE BASED.

SPRING SEASON (SEP OCT NOV) TOTAL OBSERVATIONS USED 43 671

TABLE 11A CRITERIA (CLOUD MORE THAN 4/8 BELOW 1500 FEET) (VISIBILITY LESS THAN 5000 METRES) EITHER OR BOTH

DIR IN 10 DEGREES / SPEED IN KNOTS	36-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	CALM
1 - 5	15	13	12	12	10	10	9	7	9	10	14	18	14	9	5	4	8	10	
6 - 10	6	7	11	16	12	9	8	4	4	10	17	24	17	6	1	1	0+		
11 - 15	1	3	8	17	14	12	20		4	12	21	32	28	12	2				
16 - 20		3	7	11	14	12				12	24	36	28	8					
21 - 25		8		12	9				17	14	21	33	50	5					
26 - 30				20						22	10	25	11						
31 - 35											100		50						
36 - 40																			
OVER 40																			
CALM																			11

TABLE 11B CRITERIA (CLOUD MORE THAN 4/8 BELOW 700 FEET) (VISIBILITY LESS THAN 2000 METRES) EITHER OR BOTH

1 - 5	12	7	8	5	5	5	4	2	3	4	7	10	7	5	3	3	6	7	
6 - 10	2	4	5	7	4	3	5		0+	3	7	12	6	2	1				
11 - 15	1	0+	2	5	4	5	20		1	4	7	12	9	3					
16 - 20		1	2	2	4					2	7	14	13						
21 - 25				2						1	3	14	26	5					
26 - 30													11						
31 - 35																			
36 - 40																			
OVER 40																			
CALM																			7

TABLE 11C CRITERIA (CLOUD MORE THAN 4/8 BELOW 300 FEET) (VISIBILITY LESS THAN 1000 METRES) EITHER OR BOTH

1 - 5	8	5	5	2	2	1		1	3	2	3	3	2	2	1	1	3	4	
6 - 10	1	2	2	2	1	1				1	2	3	2	1	1				
11 - 15			1	0+	0+						0+	2	0+						
16 - 20					0+						0+								
21 - 25												1	3						
26 - 30																			
31 - 35																			
36 - 40																			
OVER 40																			
CALM																			4

CHRISTCHURCH AIRPORT PERIOD JANUARY 1960 - DECEMBER 1979

HOURLY OCCURRENCES OF REDUCED CEILING AND VISIBILITY

TABLE 12 CRITERIA (CLOUD MORE THAN 4/8 BELOW 300 FEET) (VISIBILITY LESS THAN 1000 METRES) EITHER OR BOTH

HOURS NZST	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL	OBSERVATIONS USED
0000	8	5	9	22	26	31	33	34	18	10	9	5	210	7302
0100	8	12	19	29	26	34	32	34	26	17	11	7	255	7304
0200	9	19	27	36	31	34	30	37	33	12	20	10	298	7304
0300	11	20	30	28	39	31	31	51	41	19	21	9	331	7302
0400	10	19	28	27	36	40	33	45	42	22	19	19	340	7303
0500	20	29	29	37	29	34	30	46	40	30	22	28	374	7304
0600	22	33	37	37	30	30	28	54	48	33	19	15	386	7305
0700	12	23	36	44	30	27	27	52	50	21	10	9	341	7305
0800	5	10	21	27	27	27	26	48	32	17	1	3	244	7303
0900		1	9	16	20	28	30	33	21	4	1		163	7305
1000			2	10	16	25	22	22	12	1			110	7305
1100			3	5	5	18	16	11	2	1			61	7304
1200					1	10	9	6	1				27	7303
1300			1		1	8	5	3	1		1		20	7304
1400	1					10	6	1					18	7305
1500					1	9	5	1			1		17	7305
1600				2	1	8	4	1	1				17	7305
1700			1		2	11	8	5	1				28	7302
1800				3	2	8	12	10	3				38	7305
1900	1		2	4	6	17	13	15	7	2	1	1	69	7304
2000	1		7	5	16	22	13	20	10	2	1		97	7304
2100	4	1	8	8	17	26	26	28	11	4			133	7304
2200	5	1	6	14	19	29	30	30	11	6	2	1	154	7303
2300	6	3	7	19	26	32	32	32	16	7	4	5	189	7302
TOTAL	123	176	282	373	407	549	501	619	427	208	143	112	3920	
OBSERVATIONS USED	14878	13557	14878	14400	14877	14398	14878	14878	14396	14875	14400	14877		175292

Appendix

The positions of the centres of anticyclones at 0600 hours (N.Z.S.T.) and the persistence of low cloud at Christchurch and the Plains area of Canterbury during the same day has been studied by Smith (1974). Three categories of low cloud were considered, these being:

Category A "Clear" .... $\leq$ 1 okta through most of the period 0600 hrs to 1800 hrs.

Category B "Clearing" .... days on which skies were cloudy at 0600 hrs but had cleared to $\leq$ 3 oktas by 1500 hrs.

Category C "Cloudy" .... days on which the cloud cover was $\geq$ 5 oktas throughout most of the period.

The results of Smith's investigation are summarized as follows:

1. Anticyclones centred in Zone 1 (Fig. A1) at 0600 hrs are very likely to give clear or clearing skies through the rest of the day in Christchurch and over the Plains.

2. Anticyclones centred in Zone 2 will probably give persistent low cloud unless skies are clear at 0600 hrs in which case the weather remains fine.

3. Anticyclones centred in Zone 3 give no clear indication of likely persistence.

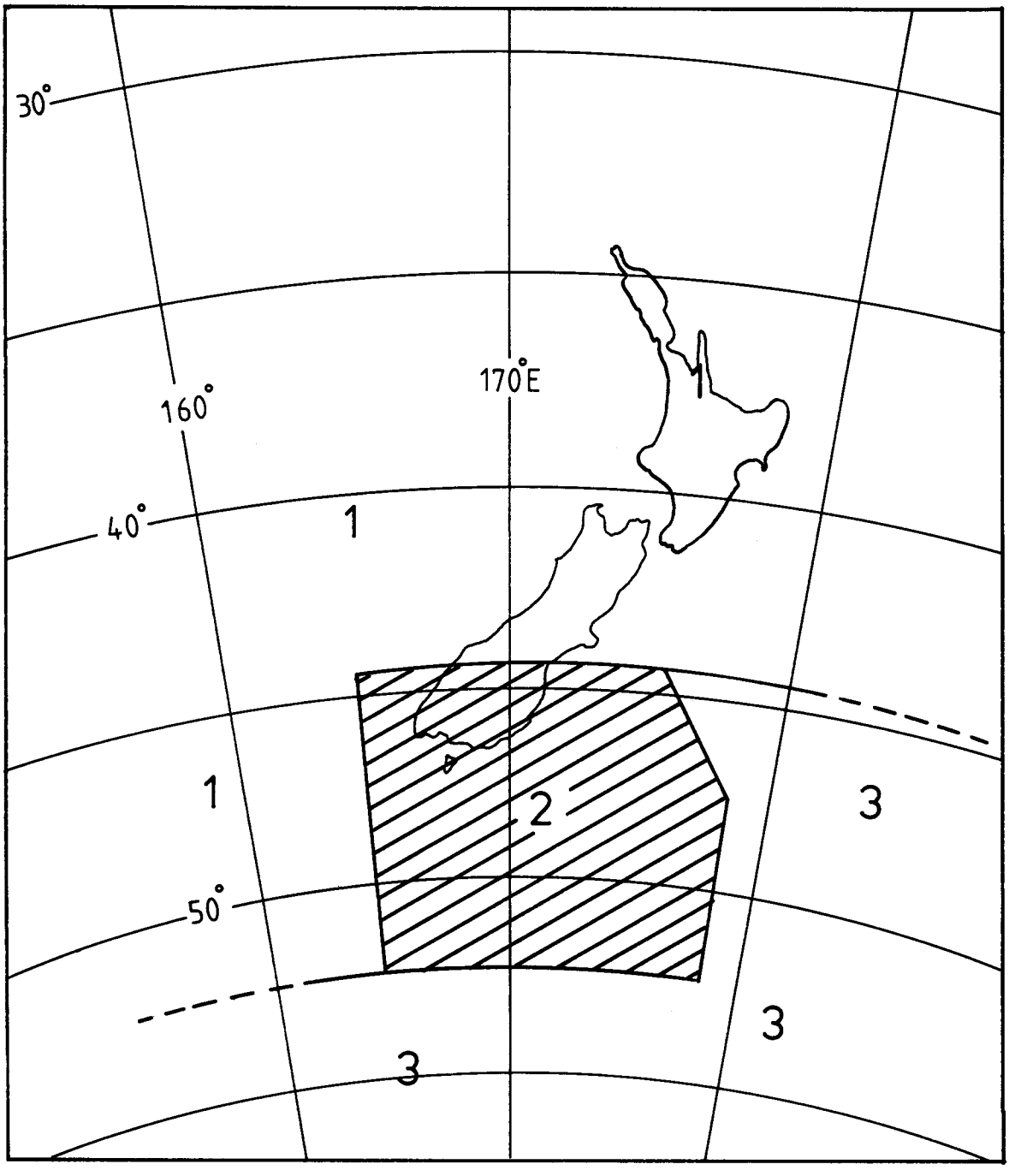

FIG A1 Position of Anticyclone centres at 0600 hrs. in relation to persistence of low cloud over Canterbury during the same day. See text for details.

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