

MOVEMENTS OF GIANT PETRELS *MACRONECTES* SPP. BANDED AS CHICKS AT ILES CROZET AND KERGUELEN

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SUMMARY

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Totals of 1 299 Northern Giant Petrels *Macronectes halli* and 884 Southern Giant Petrels *M. giganteus* have been banded as chicks at îles Crozet from 1966 to 1988, and 1 105 *M. halli* were banded at îles Kerguelen from 1950 to 1988. Recovery rates were very low, averaging 1.6% for *M. halli* and 0.7% for *M. giganteus*. They do not give a true idea of the mortality of banded birds. Most recoveries occurred in the Australia - New Zealand region, but there is no indication that juvenile giant petrels stay in special wintering areas. There is, on the contrary, good indications that they disperse downwind from west to east throughout the Southern Ocean.

INTRODUCTION

Juvenile giant petrels of both the northern species *Macronectes halli* and the southern species *M. giganteus* disperse widely at sea after fledging and spend several years away from colonies before coming back to their breeding grounds and eventually breeding (Warham 1962, Voisin 1968, 1988, Mougín 1975, Barré *et al.* 1976, Hunter 1984, Weimerskirch *et al.* 1985, Gartshore *et al.* 1988). Their dispersal and movements at sea are poorly known, except for South Georgian birds, for which Hunter (1984) made a detailed analysis of banding recoveries, and the Marion and Prince Edward Islands birds studied by Gartshore *et al.* (1988). This paper aims to analyse recovery data of juveniles of both species banded as chicks at îles Crozet and Kerguelen from 1950 to 1988. Recoveries from 1950 to 1982 have been analysed previously but briefly (Barré *et al.* 1976), Weimerskirch *et al.* 1985). The few recoveries

elsewhere of adults banded at îles Crozet and Kerguelen have been previously analysed (Barré *et al.* 1976, Weimerskirch *et al.* 1985, Voisin 1988).

METHODS

Banding of giant petrels commenced in January 1966 at îles Crozet (Table 1). From this date to the beginning of 1988, 2 183 giant petrel chicks have been ringed there, 1 299 of them being *M. halli* and 884 *M. giganteus*. Banding operations were conducted nearly every year, but with variable intensity, the numbers of banded chicks ranging from 13 in the 1966/67 austral summer to 285 in 1973/74. In contrast, banding of giant petrels was carried out on an annual schedule only from 1965/66 to 1973/74 at îles Kerguelen (Table 2), with a few additional chicks ringed from 1950/51 to 1963/64, 151 in 1984/85 and 70 in 1987/88, bringing the total of giant petrel chicks banded at îles Kerguelen to 1 105. Banding data from îles

TABLE 1

RECOVERIES OF GIANT PETRELS BANDED AS CHICKS AT ILES CROZET, 1966/67 TO 1987/88

Breeding season	Northern Giant Petrel <i>M. halli</i>			Southern Giant Petrel <i>M. giganteus</i>		
	Number banded	Number of recoveries	Recovery rate (%)	Number banded	Number of recoveries	Recovery rate (%)
1965/66	25	1	4	21	0	0
1966/67	10	2	20	3	0	0
1967/68	8	0	0	20	1	5
1968/69	25	0	0	53	0	0
1969/70	86	4	4.7	5	0	0
1970/71	109	2	1.8	88	1	1.1
1971/72	21	2	9.5	72	0	0
1972/73	87	1	1.1	34	0	0
1973/74	101	2	2	184	1	0.5
1974/75	1	0	0	64	1	1.6
1975/76	17	2	11.8	20	0	0
1976/77	31	0	0	75	1	1.3
1977/78	46	0	0	45	0	0
1978/79	42	1	2.4	6	1	16.7
1979/80	105	2	1.9	28	0	0
1980/81	80	0	0	37	0	0
1981/82	63	0	0	27	0	0
1982/83	126	0	0	6	0	0
1983/84	0	0	0	0	0	0
1984/85	117	3	2.6	19	0	0
1985/86	0	0	0	0	0	0
1986/87	90	0	0	35	0	0
1987/88	109	0	0	42	0	0
Total	1 299	22	1.7	884	6	0.7

TABLE 2

RECOVERIES OF NORTHERN GIANT PETRELS *M. HALLI* Banded AS CHICKS AT ILES KERGUELEN, 1950 TO 1988

Breeding season	Number banded	Number of recoveries	Recovery rate (%)
1950/51	2	0	0
1951/52	5	0	0
1962/63	11	0	0
1965/66	33	0	0
1966/67	31	0	0
1967/68	25	0	0
1968/69	0	0	0
1969/70	183	0	0
1970/71	148	3	2
1971/72	47	3	6.4
1972/73	150	3	2
1973/74	159	5	3.1
1984/85	151	1	0.7
1987/88	70	0	0
Total	1 015	15	1.5

Crozet and Kerguelen kept in the files of the Centre de Recherches sur la Biologie des Populations d'Oiseaux, Paris are used in this study. For the period 1965 - 1980, I also made use of the special file of the Equipe de Recherche en Biologie Animale Antarctique, Paris, which contains data on the birds of île de la Possession, îles Crozet.

Species determination was made in the field by experienced observers, or after the data in the files according to the criteria of Voisin (1988). Whereas both species breed in good numbers at îles Crozet, (Jouventin *et al.* 1984, Voisin 1984, 1988), *M. giganteus* is extremely rare at îles Kerguelen (Thomas 1983, Weimerskirch *et al.* 1989, pers. obs.) and was not banded there. Thus, only *M. halli* and *M. giganteus* from îles Crozet and *M. halli* from îles Kerguelen are considered in this study; undetermined birds are excluded from it. Because the total number of recoveries is small (43), I have not used statistical tests.

RESULTS

Twenty-two juvenile *M. halli* and six juvenile *M. giganteus* from îles Crozet and 15 juvenile *M. halli* from îles Kerguelen were recovered, which give very low recovery rates: 1.5% for *M. halli* of both localities and 0.7% for *M. giganteus* (Tables 1 & 2). Recovery rates of *M. halli* from îles Crozet and îles Kerguelen are similar, whereas that for *M. giganteus* is lower. If only years where more than 30 chicks have been banded are considered, recovery rates varied from 6% (Kerguelen 1971/72) to nil for *M. halli* and from 1.6% to nil for *M. giganteus*.

Giant petrels banded as chicks at îles Crozet and Kerguelen have been recovered from throughout the southern hemisphere between 25 and 55 degrees of latitude (Figs. 1, 2 & 3). For both species, most recoveries have been made in the Australia - New Zealand region, where 24 *M. halli* and five *M. giganteus* have been recovered (67.4% of all recoveries; Tables 3 & 4). From the available data, no difference could be found between the

distribution of recoveries of juvenile *M. halli* and *M. giganteus* from îles Crozet (Figs. 1 & 3, Table 3). In contrast, the pattern of recoveries of *M. halli* banded at îles Kerguelen and îles Crozet is somewhat different, proportionally more birds from îles Crozet having been recovered at lower latitudes along the Australian coast than were birds banded at îles Kerguelen (Figs. 1 & 2, Tables 3 & 4).

If recoveries, the dates of which are too uncertain, are excluded, it can be shown that juvenile giant petrels are older when recovered farther east (Tables 3 & 4). There are nevertheless a few exceptions: the *M. halli* which were recovered along the coast of eastern Australia were on average older than the ones found in the rest of the Australia - New Zealand region, and a few juveniles may have travelled very fast, like the one which was recovered, aged only seven months, on the coast of Tierra del Fuego, and two birds recovered on the South African coast, aged respectively eight and eleven months. These two birds may have travelled against the prevailing westerly winds, as suspected by Weimerskirch *et al.* (1985). Juvenile giant petrels from îles Crozet and Kerguelen disperse throughout the Southern Ocean within one year after fledging.

Of the 33 juvenile *M. halli* recovered, the fate of which is known with certainty, 20 (60.6%) were dead or dying when recovered. The others were alive, even if they died subsequently from injuries incurred during capture (e.g. from being caught by fishing lines). Similarly, of four juvenile *M. giganteus*, the fates of which are well documented, only one was alive when recovered. The cause of death was unknown in almost all cases.

DISCUSSION

The above patterns of dispersal are consistent with those of Conroy (1972), Barré *et al.* (1975), Brown & Oatley (1982), Weimerskirch *et al.* (1985) and Gartshore *et al.* (1988). The low recovery rates are similar to those given by Hunter (1984) and



Figure 1

Recoveries of Northern Giant Petrels *Macronectes halli* banded as chicks at Îles Crozet, 1966 - 1988. Each black triangle represents one recovery.

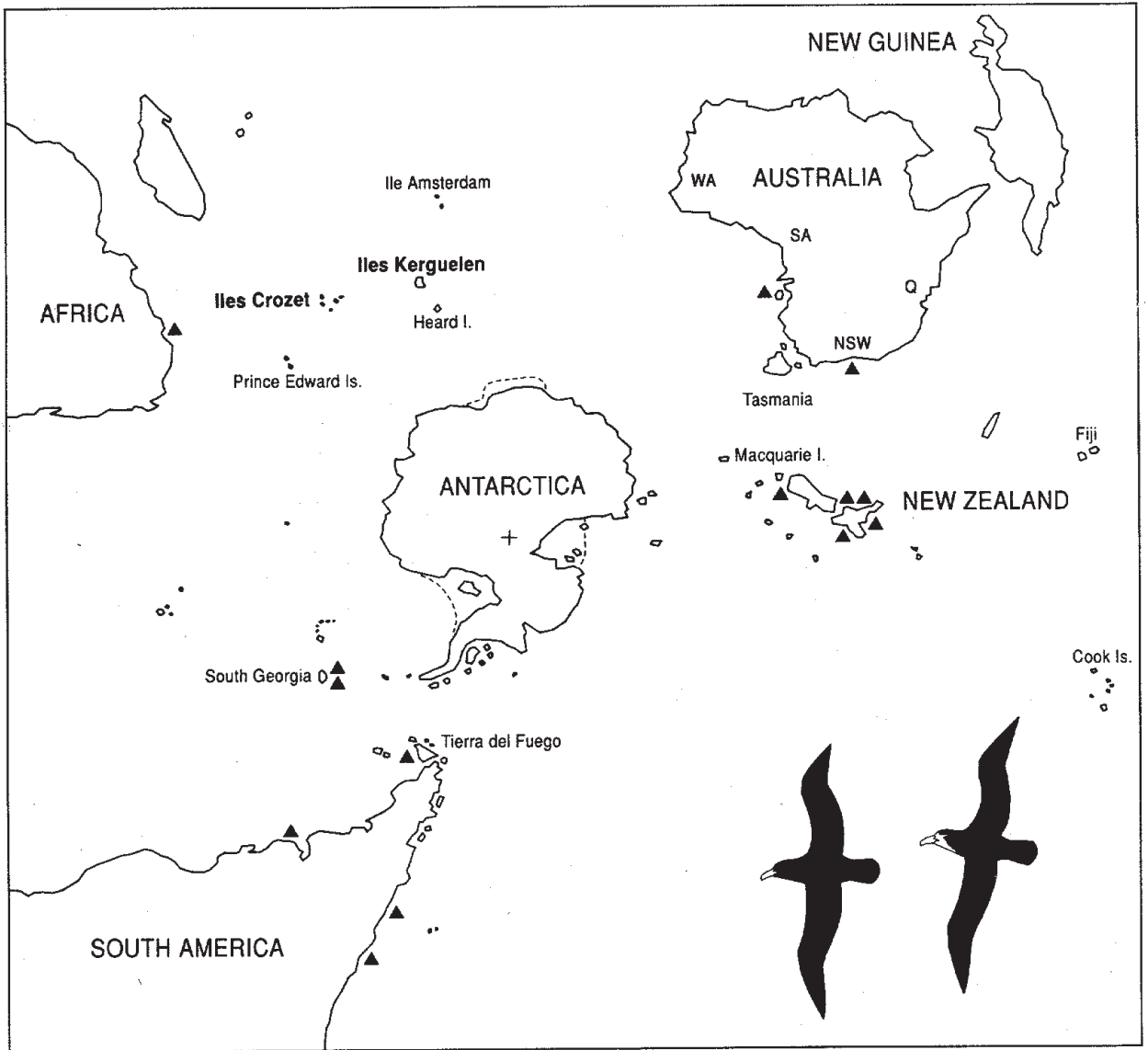


Figure 2

Recoveries of Northern Giant Petrels *Macronectes halli* banded as chicks at Îles Kerguelen, 1950 - 1988. Each black triangle represents one recovery.

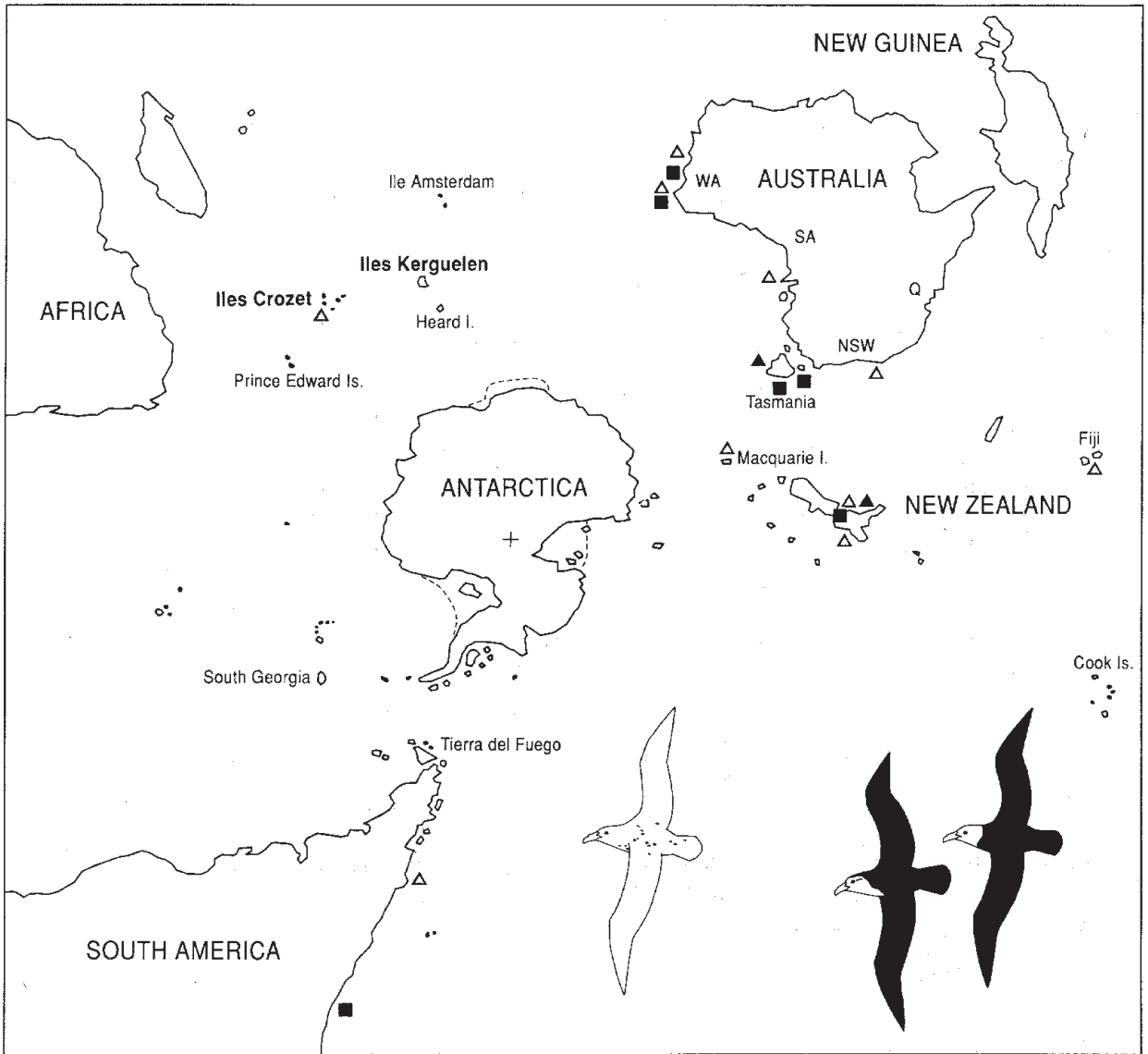


Figure 3

Recoveries (solid squares) of Southern Giant Petrels *Macronectes giganteus* banded as chicks at îles Crozet, 1966 - 1988, and recoveries of Northern Giant Petrels *M. halli* (solid triangles) and southern Giant Petrels *M. giganteus* (open triangles) banded as chicks at the Prince Edward Islands, after Brown & Oatley (1982) and Gartshore *et al.* (1988). Each symbol represents one recovery.

TABLE 3

LOCALITIES AND AGE OF RECOVERY OF GIANT PETRELS BANDED AS CHICKS AT ILES CROZET

Locality	Northern Giant Petrel <i>M. halli</i>			Southern Giant Petrel <i>M. giganteus</i>		
	Number recovered	Age (months) [*] mean	range	Number recovered	Age (Months) mean	range
Australia (total)	8	14.1	6-35	4	11.5	7-18
W Australia	4	10	6-14	2	10	7-13
S Australia	1	11	-			
Queensland & NSW	3	20.7	12-35			
Bass Strait				1	8	-
Tasmania				1	18	-
New Zealand	6	14.3	6-27	1	7	-
Cook Islands	1	10	-			
Chile	2	15.5	14-17	1	15	-
Uruguay	1	25	-			
South Africa	3	22.7	8-36			
South Georgia	1	52	-			

* *M. halli* are all supposed to have hatched on 1 October, *M. giganteus* on 1 December.

TABLE 4

LOCALITIES AND AGE OF RECOVERY OF NORTHERN GIANT PETRELS *M. HALLI* BANDED AS CHICKS AT ILES KERGUELEN

Locality	Number recovered	Age (months)	
		mean	range
Australia (total)	2	10	10-10
South Australia	1	10	-
New South Wales	1	10	-
New Zealand	6	12.8	10-16
Chile	2	13	7-19
Tierra del Fuego	1	7	-
Uruguay	1	? *	-
South Africa	1	11	-
South Georgia	2	87.5	87-88

* : ? = no precise indication of age, up to 36 months.

Gartshore *et al.* (1988). They do not give any clear idea of mortality rates, which are high in all cohorts of juveniles, because very few birds banded as chicks at îles Crozet have been subsequently recovered as breeders or prebreeders (Voisin 1988). The bulk of mortality must occur at sea, and the corpses never recovered. Band loss occurs, but is unlikely on such a scale. Thus, the problem of recruitment of new breeders at îles de la Possession, îles Crozet (Voisin 1988) remains unsolved.

Most recoveries occurred in the Australia - New Zealand region, apparently for several reasons. Bands are more likely to be recovered in those countries where there are many people interested in birds (Weimerskirch *et al.* 1985). Other reasons may be that long-line fishing is very important in the Australian region, and that the Australian and New Zealand land masses are arranged more or less like a funnel where birds get concentrated when travelling eastward, thus giving a better chance of recovering bands. A last reason could well be that juvenile giant petrels arrive in this region shortly after departure from their colonies, and before mortality has affected them heavily, so that they are still numerous.

There is no indication that juvenile giant petrels of either species stay in special wintering areas. The above-mentioned reasons explain the higher numbers of recoveries in the Australia - New Zealand region. However, there is good evidence that juvenile giant petrels disperse passively downwind from west to east. The two birds aged respectively 27 and 34 months which have been recovered on the Australian and New Zealand coasts may have been returning to the region for the second or third time. The difference in recovery distribution of juvenile *M. halli* banded at îles Crozet and Kerguelen reflects the four to six degrees difference in latitude of the two island groups. The îles Crozet birds have been recovered in the same general area as those banded at Marion Island (Brown & Oatley 1982, Gartshore *et al.* 1988) (Fig. 3). Moreover, as already noted by

Conroy (1972) for *M. giganteus* and Weimerskirch *et al.* (1985) and Gartshore *et al.* (1988) for both species, there is a tendency for the birds to become older when recovered farther east. The two juveniles aged eight and eleven months which were recovered on the South African coast may be exceptions. But as a whole, juvenile giant petrels of both species probably wander over the Southern Ocean, under the influence of the prevailing westerlies. At least some of them may circle the Antarctic Continent, and a few venture northwards along the coasts of eastern Australia and southern America, or to South Africa. After a few years they may visit colonies at islands other than their native ones, and indulge in prebreeding behaviour, as documented for three *M. halli* recaptured at South Georgia, but as a rule they do not settle down there and come back to their native islands, if not to their native colonies, when they become old enough to breed (Hunter 1984, Gartshore *et al.* 1988, Voisin 1988).

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