

GIANT PETRELS *MACRONECTES* SPP. INCREASED AT ILES CROZET BETWEEN 1966 AND 1980

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The basic objection made by Bretagnolle *et al.* (1991) to my paper on the breeding biology of the Northern and Southern Giant Petrels *Macronectes halli* and *M. giganteus* at île de la Possession, îles Crozet (Voisin 1988) relates to the way breeding populations were estimated. Taking the 1980 value in the eastern colonies as an example, they deduce that I made an underestimate of c. 50%, which in fact should be 32.2% if calculated properly. They do not discuss the results for the whole island.

Here I am somewhat surprised because these numbers of breeding giant petrel pairs had been communicated to me by H. Weimerskirch himself (Bretagnolle *et al.* 1991), as shown in a letter by P. Jouventin to me of 16 April 1985, a letter by H. Weimerskirch to me of 21 May 1985 and two maps of île de la Possession where H. Weimerskirch plotted the place of each colony and the numbers of breeding pairs in them in 1980. Photocopies of these documents have been deposited with the Editor of *Marine Ornithology*. The only modifications which I brought to these data were extremely small, and were the following: when comparing them with other sources, i.e. banding files, I discovered that about five Southern Giant Petrel nests had been omitted at Baie de la Chaloupe, three of them having been possibly mistaken for Northern Giant Petrel nests. Thus I indicated (Table 15, Fig. 8) that the eastern colonies harboured 43 pairs of Northern and five pairs of Southern Giant Petrels in 1980, a result little different from 46 and none indicated by H. Weimerskirch for the same region on his map.

But, in this case, where do the 71 nests counted by

Bretagnolle *et al.* (1991) come from? Since they do not question the rounded totals for both species on the whole island, which are theirs, the most likely explanation is that there is some misunderstanding in the definition of the eastern localities. In Table 16 (Voisin 1988), the eastern localities are restricted to breeding localities 135, 141, 144, 221, 223, 224 and 251. Localities 351, 352 and 360 are then excluded. There were 71 nests in 1980 in localities 135, 141, 144, 251, 351, 352 and 360 according to H. Weimerskirch's map. It seems then that Bretagnolle *et al.* (1991) misunderstood the restriction of the eastern localities given by Voisin (1988). There is no discrepancy between their numbers and mine.

In addition to H. Weimerskirch's counts, I used detailed field notes for the breeding seasons of 1966/67, 1968/69, 1969/70, 1973/74, 1976/77 and 1977/78. Moreover, I paid a visit to localities 141 and 144 on 7 January 1974, and, according to H. Weimerskirch's letter of 21 May 1985, all giant petrel chicks were banded at îles de la Possession in 1978. For these years, I estimated giant petrel numbers from both field notes and banding files, a count in the field being *always* preferred whenever possible (Voisin 1988). Banding and recapturing in some colonies was often done so thoroughly at the beginning of the breeding season that it was nearly equivalent to a count, which was very useful for checking results obtained from banding files of chicks.

If there were any important underestimates in calculating nest numbers from banding files, it should be smallest for years when counts were

available, and greatest for years between them, resulting in large fluctuations, but this does not appear to be the case (Table 15 and Fig. 8, Voisin 1988).

It is highly improbable that giant petrel colonies had escaped detection all the time from 1966 to 1980, even if it is possible for small groups of nests to have remained overlooked for a few years. Since the building of huts at Pointe Basse (770), Baie du "la Pérouse" (720) and Baie Américaine (360), biologists have walked all over the island, often to its western end. They would presumably have reported new colonies and even banded birds in them. Since this did not happen, I conclude that the localities discovered in the late seventies and in 1980 were new ones. Mougin (1970a,b,c) and Despin (1972) show that by 1968/69 the whole of île de la Possession had been covered, except perhaps for a few inland peaks. There are also reports by people who did not find anything at places where giant petrel colonies were subsequently discovered. For example, M. Segonzac (pers. comm.) did not find any at Pointe des Moines in 1969, nor did J.-L. Mougin (pers. comm.) nor I find colonies at Trou du Diable in respectively 1968 and 1966. In 1977, "the first year when a precise count 'in the western colonies' was conducted" (Bretagnolle *et al.* 1991), no colonies were recorded in localities 221, 224, 251, 522 and 960. Despin (1972) obviously walked into Baie du Petit Caporal, but did not band giant petrels there.

It was not possible to know how accurately breeding success had been recorded each year and in each colony, except when precise counts had also been made (Voisin 1989). Thus I could only use the average figure of 40% (Voisin 1968, 1976, Mougin 1975), which is consistent with the results of Warham (1962) for both species combined at Macquarie Island and those of Conroy (1972) for the Southern Giant Petrel at Signy Island. But, as I always preferred a count in the field to calculation, imprecision was kept to a minimum.

As stated in Table 15 (Voisin 1988), the 1966 numbers of giant petrel nests at île de la Possession are a *minimum estimate*, not a precise count, and the actual value may have been much higher. This estimate comprises the 112 nests which I counted in the eastern localities, including localities 251, 351, 352 and 360, as well as 60 Northern Giant Petrel nests which I counted at Baie du "la Pérouse" (Voisin 1968). The balance is an estimate of the number of nests of both species not counted at Baie du "la Pérouse" because of bad weather, and a guess of the numbers at Pointe Basse, assuming that Southern Giant Petrels were present in these two localities in the same proportion as in the eastern localities. Contrary to the assertion of Bretagnolle *et al.* (1991), the large breeding locality of Pointe Basse (= la Grande Coulée, 700) was not discovered by J.-L. Mougin in 1968, but by R. Tufft and H.W. Tilman in January 1960 (Tilman 1961, Mougin 1970a), and there were then at least 50 nests in it (R. Tufft unpubl. data).

The only logical conclusion is that, after a small decrease, giant petrel populations increased strongly at îles de la Possession from 1966 to 1980. This increase was matched by an increase in giant petrel populations at île aux Cochons, îles Crozet from 1974 to 1982 (Voisin 1984). In South Georgia, Hunter (1984) observed a similar increase for Northern Giant Petrels, whereas Southern Giant Petrels decreased to the 1972/73 level after a peak in 1978. A comparison with Antarctic localities (Bretagnolle *et al.* 1991) may not be valid because of different ecological conditions, and comparisons with Heard Island should be made with caution, above all because it has only been visited a very few times by ornithologists in the two last decades, so that fluctuations in its giant petrel populations may have remained unnoticed. Giant petrel populations at îles Crozet may perhaps be stable or decreasing now, but in my 1988 paper I analysed trends from 1966 to 1980. Here it can be noted that Bretagnolle *et al.* (1991) did not provide any precise count nor estimate in order to support their challenge of my results for that period.

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