

# **BREEDING DISTRIBUTION OF THE BLACK-BROWED ALBATROSS *THALASSARCHE MELANOPHRYS* – GLOBAL OBSERVATION AND PREDICTION OF THE USE OF SPACE BY A WIDE-RANGING, GENERALIST MARINE PREDATOR**

Wakefield Ewan<sup>1</sup>, Richard Phillips<sup>1</sup>, Jason Matthiopoulos<sup>2</sup>, Javier Arata<sup>3</sup>,  
Rosemary Gales<sup>4</sup>, Nic Huin<sup>5</sup>, Graham Robertson<sup>3</sup>, Susan Waugh<sup>6</sup>  
and Henri Weimerskirch<sup>7</sup>

<sup>1</sup> British Antarctic Survey, Natural Environment Research Council, High Cross, Madingley Road,  
Cambridge, CB3 0ET, United Kingdom  
E-mail: [ewdw@bas.ac.uk](mailto:ewdw@bas.ac.uk)

<sup>2</sup> NERC Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, Fife KY16  
8LB, United Kingdom

<sup>3</sup> Australian Antarctic Division, Channel Highway, Kingston, TAS 7050, Australia

<sup>4</sup> Nature Conservation Branch, Department of Primary Industries, Water and Environment, PO Box  
44, Hobart, Tas. 7000, Australia

<sup>5</sup> Falklands Conservation, PO Box 26, Stanley FIQQ 1ZZ, Falkland Islands

<sup>6</sup> Sextant Technology Ltd, 116 Wilton Road, Wellington, 6012, New Zealand

<sup>7</sup> Centre d'Etudes Biologiques de Chizé, Centre National de la Recherche Scientifique, 79360  
Villiers-en-Bois, France

For almost 20 years it has been possible to record the movements of pelagic seabirds using satellite-tracking. While this technique has provided a wealth of data on the behaviour and distribution of individuals, it has not hitherto led to robust, population-level predictions of spatial usage or to the prerequisite quantification of habitat preferences. This is a shortcoming, given that many seabirds, such as the albatrosses, currently face dire threats from bycatch. We used mixed effects Generalised Additive Models, black-browed albatross satellite tracks from nine Subantarctic colonies and remotely sensed oceanographic data, to address this shortcoming. We modelled spatial usage of breeding (and therefore central place constrained) albatrosses, as a function of accessibility (distance<sup>-1</sup>) and habitat preference. Although, like most pelagic seabirds, black-browed albatrosses are generalists, we show that across populations they have quantifiable habitat preferences, primarily for neritic and shelf slope waters. In addition, during incubation, they most prefer warm (~16°C) waters, which often lay to the north of their Subantarctic colonies. However, this species also has sufficient plasticity to exploit other habitats. Hence, birds from South Georgia also forage in the oceanic waters of the Brazil/Malvinas Confluence, an area characterised by very high mesoscale turbulence. During the post-brood stage, their lack of temperature preference means that birds from some populations travel further south, into Antarctic neritic and slope waters. During this stage, birds also tend to prefer areas >600km from neighbouring conspecific colonies, a behaviour that we hypothesise arises due to intraspecific competition, which is more intense than during incubation. Using our models and regional population data, we show that it is possible to predict the worldwide distribution and density of breeding black-browed albatrosses, an advance that we hope will lead to better conservation measures and to further insights into the ecology of seabirds.