

## Choosing the right response: importance of time-scales in animal ecology

C. Saraux<sup>a,b,c,d</sup> T. Rouyer<sup>a</sup>, S. Bonhommeau, A. Chiaradia<sup>e</sup>

<sup>a</sup> IFREMER, UMR EME, Avenue Jean Monnet, BP171, 34203 Sète Cedex France

Claire.saroux@ifremer.fr

[Sylvain.bonhommeau@ifremer.fr](mailto:Sylvain.bonhommeau@ifremer.fr)

Tristan.rouyer@ifremer.fr

<sup>b</sup> Institut Pluridisciplinaire Hubert Curien, Université de Strasbourg, Strasbourg, France

<sup>c</sup> Centre National de la Recherche Scientifique, Unité Mixte de Recherche 7178, Strasbourg, France

<sup>d</sup> AgroParisTech ENGREF, Paris, France

<sup>e</sup> Department Research Department, Phillip Island Nature Parks, P.O. Box 97, Cowes,

Victoria 3922, Australia

achiaradia@penguins.org.au

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**Abstract:** Though essential, understanding how climate variability may influence ecosystems is no trivial endeavour. Climate is a dynamic assemblage of numerous parameters and choosing which parameters are likely to affect the ecosystem, and on which spatio-temporal scale to study them, are fundamental questions that need to be addressed at the start of any investigation. Here, we exemplify the issue of time scale using an inshore top predator, the little penguin, *Eudyptula minor*, as a model. Combining previously-published and new data, we revealed a paradigm that, depending on the time scale, different breeding parameters can respond in opposite directions when investigating climate effects. Indeed, we show that breeding success of little penguins was affected by mean sea surface temperature (SST) either positively when averaged over the entire breeding period, or negatively when investigating weekly patterns, in contrast to previously published results based on monthly SST values showing no direct relationship. Such findings highlight the need to study the effects of climate at ecologically relevant temporal scales, both long (*e.g.* the full breeding period) and short (*e.g.* the week). Using cumulative integrations on our decadal weekly dataset (DiLorenzo & Ohman 2013), we propose an interesting methodology to objectively investigate the time scale at which biological parameters (*e.g.* chick body mass changes, mortality, etc.) could respond to SST.

### References

DiLorenzo, E. and Ohman, M.D. (2013) A double integration hypothesis to explain ocean ecosystem response to climate forcing. *PNAS*, 110:2496-2499.