

## FLIGHT DYNAMICS OF A PELAGIC SEABIRD FORAGING IN A COASTAL ENVIRONMENT: THE CORY'S SHEARWATER CASE

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Inspecting how differently seabird species adapt their flight patterns in order to cope with the heterogeneity of their habitats and, determining whether birds planned to use the wind field or simply experience it, are two of the major topics influencing flight dynamic theories. Here, we present for the first time the three-dimensional flight dynamics of Cory's shearwaters *Calonectris diomedea* foraging in the upwelling region of the continental Portuguese coast. We reconstructed the two-dimensional movement of the birds with the deployment of recently miniaturized devices for telemetry; the global positioning systems loggers (GPS-loggers) that also store altitudinal movement of the birds. Cory's shearwater benefited from using the wind field in this continental shelf habitat. Prevalent winds were blowing from north-east and adults used those winds by adjusting their flight directions mainly towards north-west and south-west, meaning flying with cross (28.5%) and tail winds (31.4%), respectively, and avoiding head winds (7.9%;  $\chi^2_4 = 10.4$ ,  $P = 0.02$ ). During travelling phases flight speed was strongly influenced by the position of the bird with regard to the wind direction, as flight speed increased significantly with increasing Tail Wind Component values ( $TWC = 3.98X + 34.53$ ,  $r^2 = 0.29$ ,  $N = 27$ ,  $P = 0.04$ ). Cory's shearwater may also invest on shear soaring flying while exploiting the environment for food. Birds foraged mainly with side winds and ground speed used to forage was not constant during the foraging trip, it changed dynamically with altitude as a result of the ocean surface shear winds. Tail winds seemed to be more used for travelling speedy movements as they were concentrated at the beginning and at the end of the day. Cory's Shearwater concentrated their flying periods during the morning and afternoon, and the period around noon was used to rest on the sea-surface. Timing of higher flight velocity peaked in the morning and in the evening. At a larger scale the general heading taken from the colony seemed to be influenced by wind, but also by previous knowledge of productive zones (commuting behaviour). With such strategy, Cory's shearwaters presumably return to a (memorized) particular place in order to search and consume food, thereby spending less time in obtaining meals for themselves or their offspring.