Where did common porpoise (*Phocoena phocoena*) come from before stranding?

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Since the end of the 1990's, a strong increase in the stranding of the common porpoise *(Phocoena phocoena)* has been observed in the southern North Sea. As strandings currently yield most of information about the composition of the populations of marine mammals, our study aims to characterize the main characteristics within the stranded population, and to refine the representativeness of the strandings as an ecological indicator of the populations at sea. Therefore, the information collected during the necropsies of 893 animals stranded between 1990 and the end of June 2013 on the Belgian and northern French coast was used. Furthermore, a first attempt to model the backtracking drift of carcasses was used to estimate the origin of the death of animals. The simulations were realized over two major stranding peaks (from March 1st till May 31st 2006 and from March 20th till May 20th 2013) by means of the OSERIT 1.0 software (Oil Spill valuation and Response Integrated Tool). One of the main causes of death is by-catch (accidental capture in fishing nets), which mostly concerns the juveniles, due to the more coastal distribution of this specific age group. Additionally, most of by-caught animals died in the western water of our study area and drift some days before stranding. By-catch represents more than half the causes of death during the main peak of stranding. This peak occurs in spring and can be partially explained by the strong concentration of recreational fishing during this period in the Western part of the studied area. The model simulations suggested that a large part of the found animals come from waters lining the Dutch, Belgian and northern French coast. Moreover, their likely areas of origin are very wide, covering the English Channel and the southern North Sea. This phenomenon could be partially explained by the current patterns, the tides and the wind, which would be the reason behind the high density of strandings on these coasts. Finally, the progressive increase of the strandings since 1990 is confirmed by our results with on average only 6.3 animals per year between 1990 and 2000, and 80.5 animals per year between 2001 and 2012. It would be explained in particular by the shift of the population of porpoises in the northern North Sea to the southern North Sea and by the higher incidence of by-catch since the beginning of the 2000's.