How can we recognise live smolts from smolts that have been eaten by fish predators in telemetry studies?

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Atlantic salmon post-smolts (n = 57) and fish predators (Atlantic cod and saithe, n = 10) were tagged with depth tags. Their behaviour was recorded by 25 automatic receivers in the Romsdalsfjord, Norway.
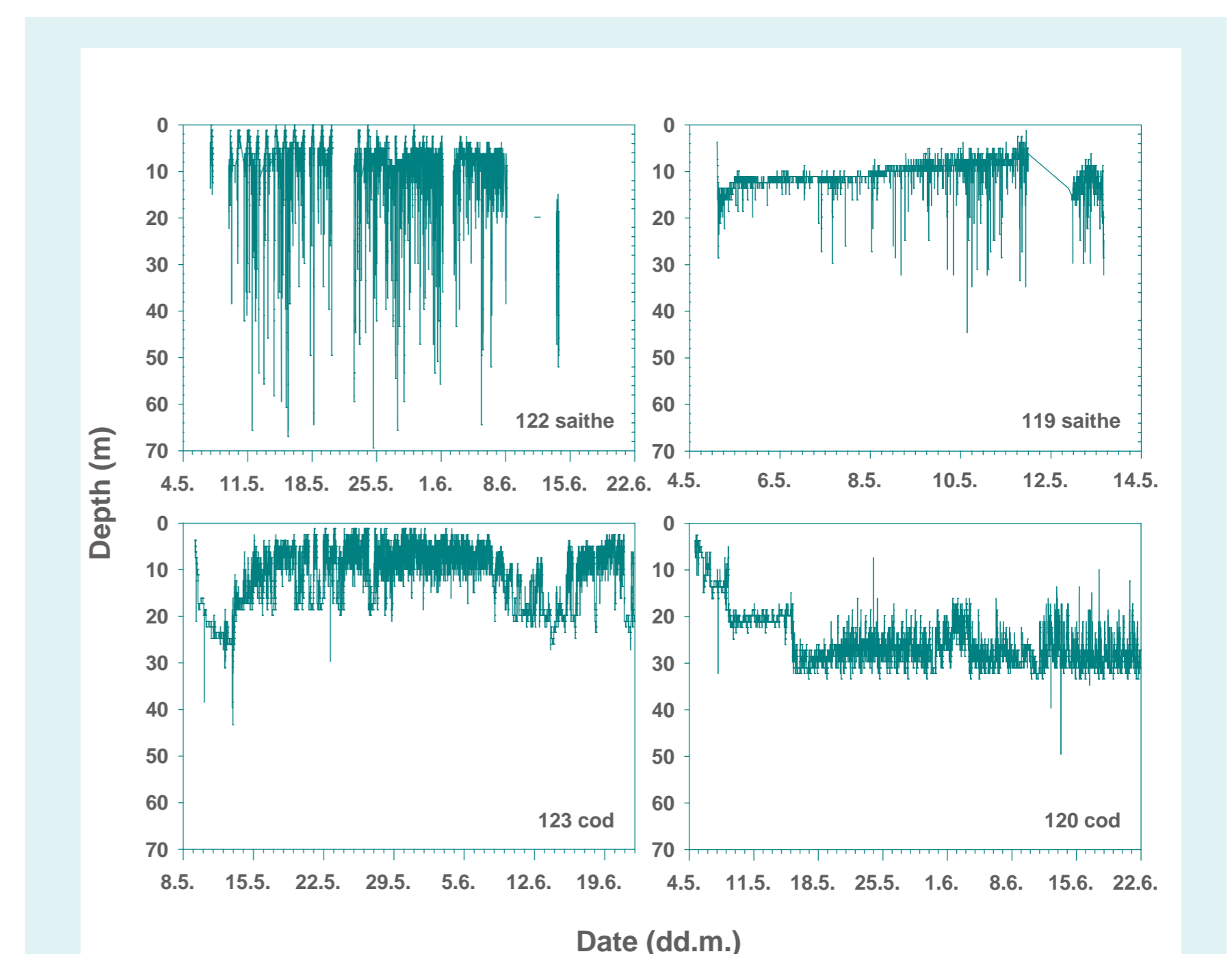
Atlantic cod

Figure 1. *Depth recordings of four individual fish predators.*
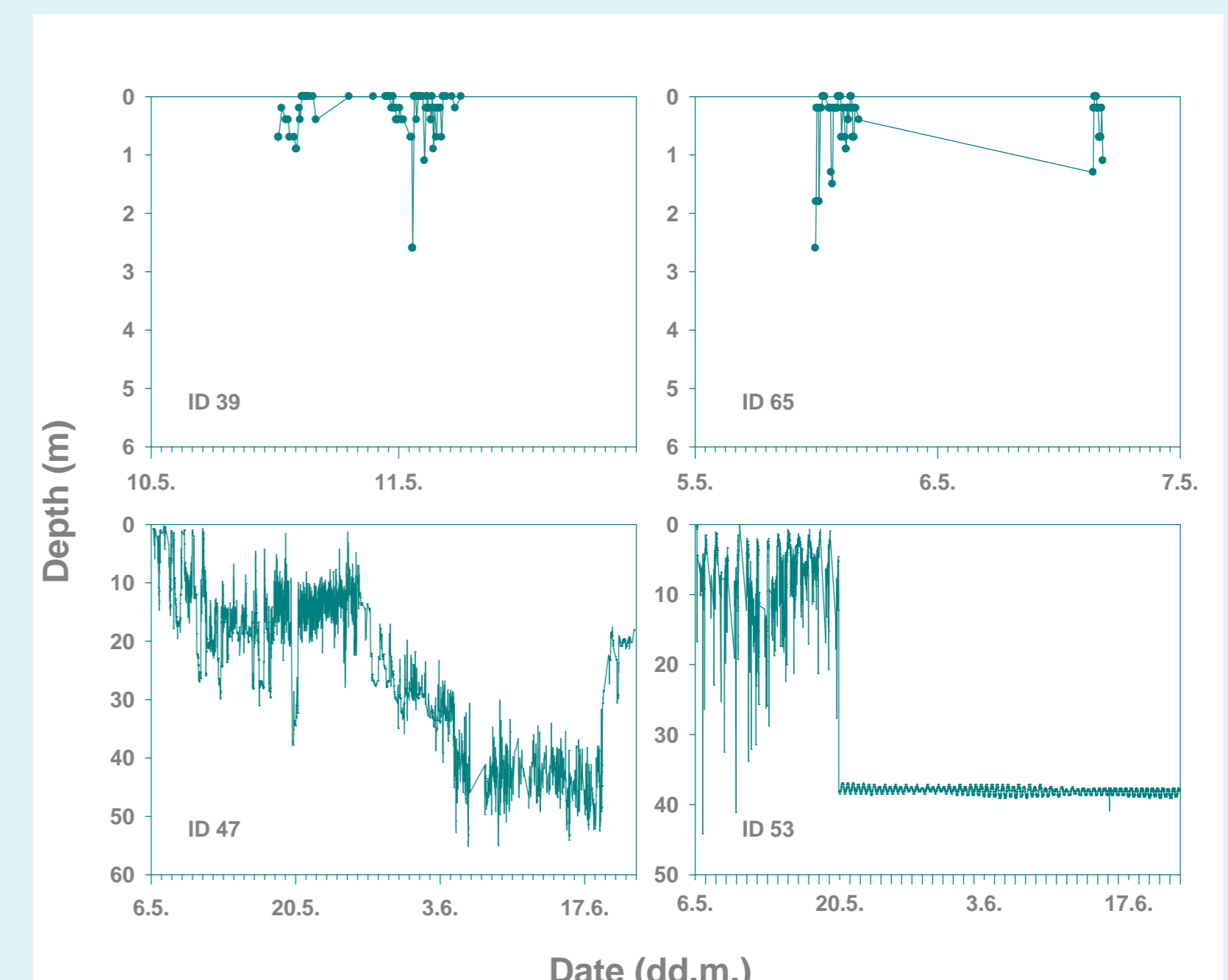

Figure 2. *Depth recordings of four individual post-smolt tags. The two post-smolts in the upper graphs show a typical vertical behaviour of post-smolts, whereas the post-smolts in the lower graphs show the typical vertical behaviour of Atlantic cod and saithe. They have likely been eaten by such a predator and the tag remained within the stomach of the predator. The tag ID 53 seems to have been expelled by the predator after 14 days and remained on the sea floor after that. Note the different scales on the y and x axes.*

One Atlantic cod and one saithe showed a typical post-smolt behaviour, i.e. directed movement out of the fjord. Hence, if a tagged post-smolt is eaten by an untagged predator, the latter might be interpreted as a post-smolt.

However, vertical behaviour differed between predators and post-smolts, with predators swimming much deeper (Figure 1 and 2).

Vertical behaviour was used to identify whether the tag was still in a live post-smolt, or whether it had been eaten by a predator.

If depth tags had not been used, mortality of post-smolts would have been underestimated (26% instead of 37% during the first 2 km of the marine migration).

Tags from eaten post-smolts remained in the body of fish predators for up to 47 days (average 29 days).