

In the dark polar winter, the animals aren't sleeping

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All sky image of the noon sky in Ny-Ålesund with four sources of illumination; sun, moon, aurora borealis and artificial light. Credit: Prof Geir Johnsen (NTNU)

You might expect that little happens in the Arctic Ocean during the cold and dark winter. But that just isn't so, according to researchers who have sampled the activities of many different species during three consecutive winters in Kongsfjorden, Svalbard. Their findings are published in the Cell Press journal *Current Biology* on September 24.

"This once and for all changes the way we think of marine ecosystems during the [polar night](#)," says Jørgen Berge of UiT The Arctic University of Norway and the University Centre in Svalbard.

"The dark polar night is not a period without any [biological activity](#) [as had been assumed]. Concealed behind the curtain of darkness is a world of activity, beauty, and ecosystem importance."

Berge says the researchers were inspired to look more closely at what happens during the polar night based on a chance encounter they had on a small boat in the middle of a Svalbard fjord.

"Above us was a starry, winter night and below us were countless blue-green 'stars' in the deep" produced by [bioluminescent organisms](#), Berge says. "The beauty of it was stunning, and the fact that so many organisms were producing light was a strong indication that the system was not in a resting mode."

He decided then and there to do a large-scale survey and ecosystem study of the polar night in one of the Svalbard fjords during three consecutive winters. Instead of an ecosystem that had entered a resting state, the researchers say they found a system buzzing with biological activity. In fact, the diversity and reproductive activity of some species was actually greater during the winter than at other times of the year.

The researchers found, for instance, that copepods and other zooplankton were actively reproducing as filter-feeding Iceland scallops kept right on growing. Baited traps with time-lapse cameras revealed an abundant and active community of shallow-water scavengers, including whelks, amphipods, and crabs.



Shrimp *Lebbeus polaris* on the blade of a *Laminaria* species. Credit: Prof Geir Johnsen (NTNU)

More information: *Current Biology*, Berge et al.: "Unexpected Levels of Biological Activity during the Polar Night Offer New Perspectives on a Warming Arctic" [dx.doi.org/10.1016/j.cub.2015.08.024](https://doi.org/10.1016/j.cub.2015.08.024)

Berge says that he and his colleagues were perhaps most surprised by the seabirds. "Not only are they there, but they are able to find their preferred food in the total darkness," he says. "We do not know how they are able to do this, and we do not know how common it is for seabirds to overwinter at these latitudes. But we [now] know that they do."

Provided by Cell Press

The findings come at an important moment in time, given a changing climate. They also raise many new questions about how those marine species are able to eke out a living through the winter, the researchers say.

As the melting ice opens up new areas of the Arctic to human activities—from the petroleum industry to fisheries and tourism—Berge says, "we can't simply assume that the dark polar night is a 'safe' period when things are not turned on. Rather, it turns out that the dark polar night is an important period for reproduction in a number of organisms, and, as such, it is probably more sensitive than other parts of the year."



Overwintering black guillemot in Kongsfjorden. Credit: Prof Geir Johnsen (NTNU)

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