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# New methods for analyzing sea ice and its influence on biological life

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Understanding of Arctic sea ice and its influence on physical, chemical and biological processes has long been hindered by lack of data and detailed measurements. Technological advancements offer new approaches for both gathering and analyzing sea ice information. An unmanned Boeing Scan Eagle aircraft was deployed over the Bering Sea from the NOAA ship MacArthur II in May and June of 2009. The flights collected over 27,000 images of both the sea ice and seals in the area, successfully demonstrating the ability to gather detailed images. Unmanned aircraft offer a few advantages: they can be deployed from small ships, fly in difficult conditions without putting their pilots at risk, fly for long duration, and be quiet enough to cause little disturbance to wildlife. Video of the flights landing, taking-off and viewing from the plane's perspective will be shown. In addition to the unique aspect of the unmanned aircraft, the ice images were analyzed using new techniques. Visual examination of the images was augmented with computer analysis (Boulder Labs, Inc.) both to characterize the types of ice and to identify the seals within the images. Results of a comparison of the human analysis and the software-assisted image analysis will be shown, with an explanation of the techniques used in the approach. These technologies–both the use of unmanned aircraft and the software-assisted analysis of images–offer new opportunities for observing sea ice and mammal populations in ways not been previously possible. These approaches could lead to new methods of observing ice and marine life in a coordinated manner across the Arctic. Both benefits and limitations of these approaches will be discussed along with some possibilities for international collaboration using these technologies in the future.