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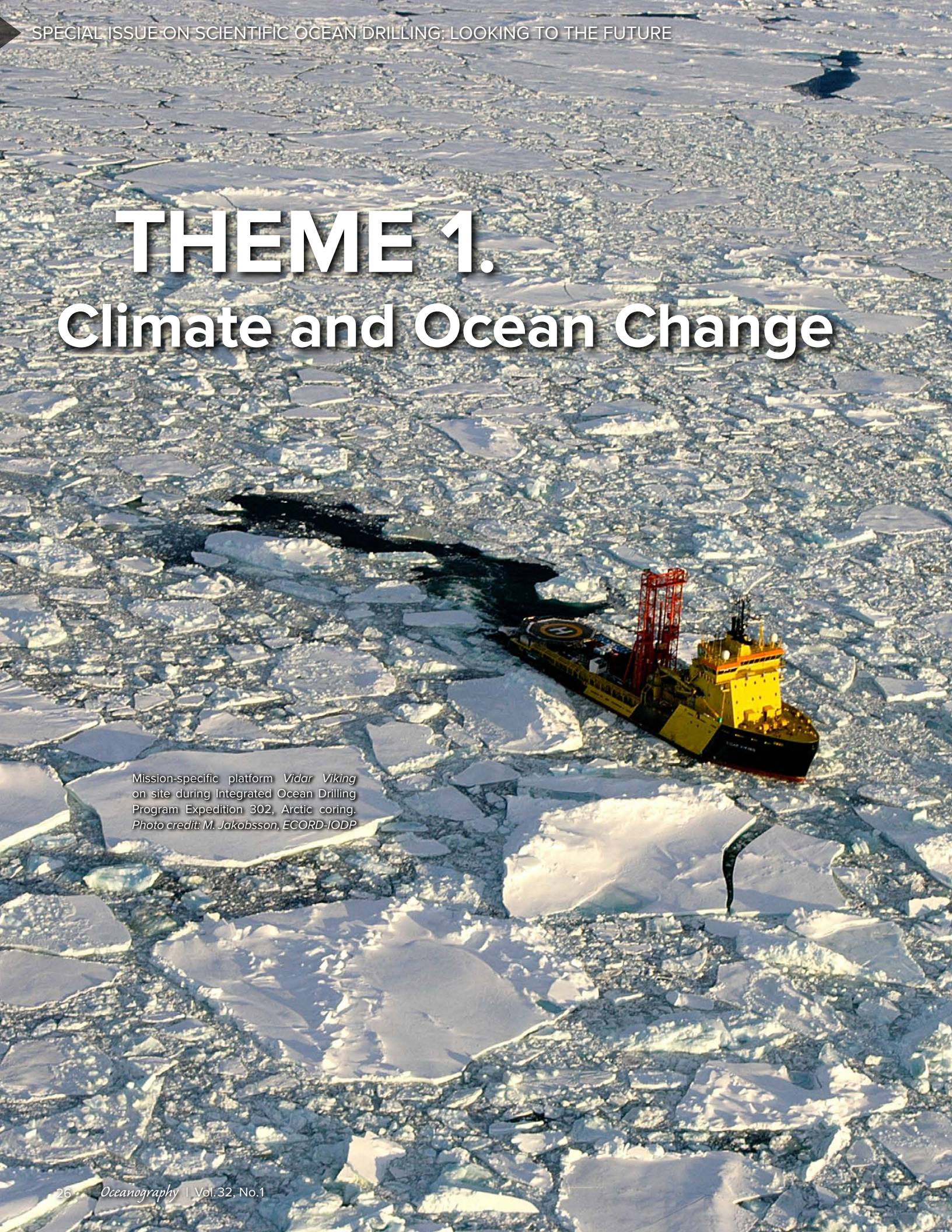
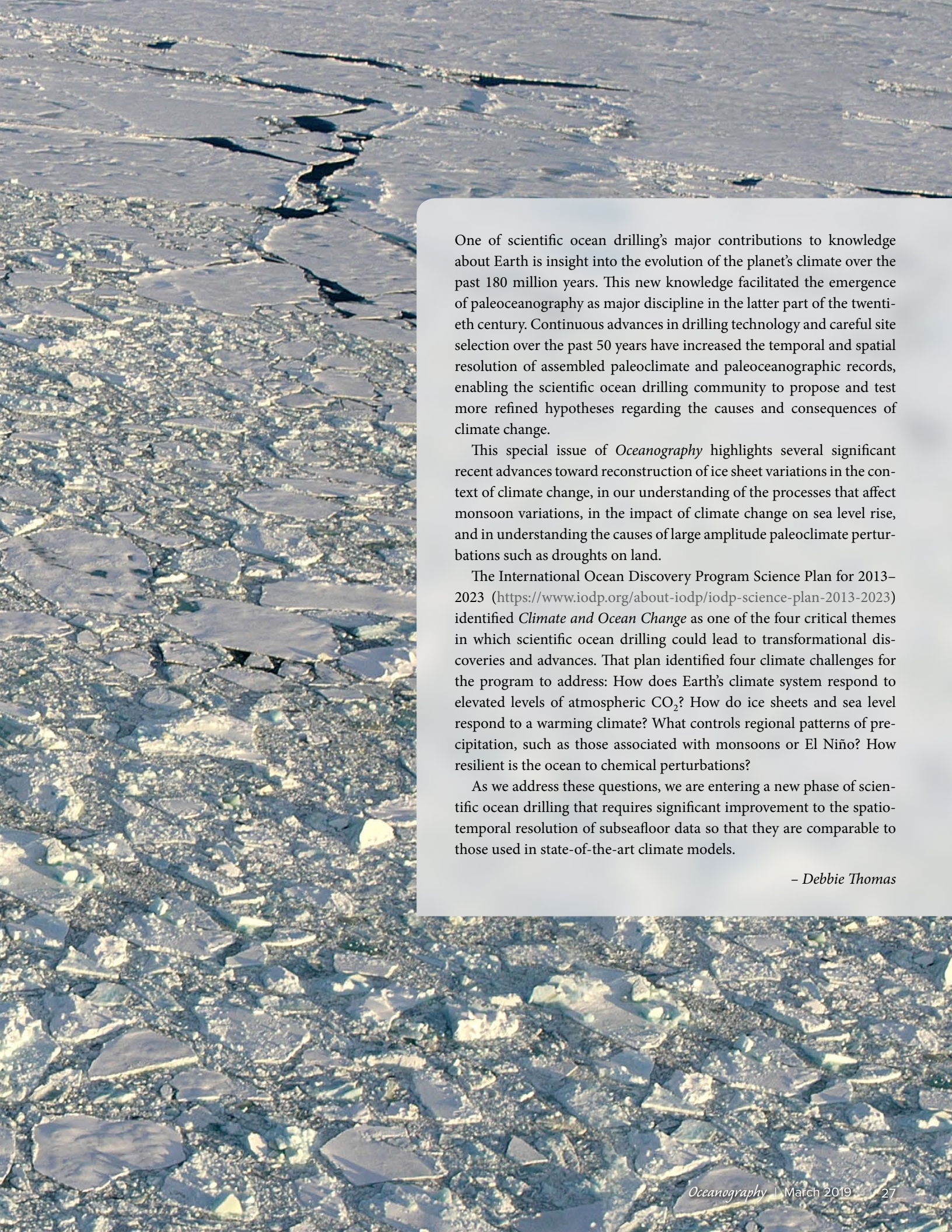
THEME 1.
Climate and Ocean Change



Mission-specific platform *Vidar Viking* on site during Integrated Ocean Drilling Program Expedition 302, Arctic coring. *Photo credit: M. Jakobsson, ECORD-IODP*



One of scientific ocean drilling's major contributions to knowledge about Earth is insight into the evolution of the planet's climate over the past 180 million years. This new knowledge facilitated the emergence of paleoceanography as major discipline in the latter part of the twentieth century. Continuous advances in drilling technology and careful site selection over the past 50 years have increased the temporal and spatial resolution of assembled paleoclimate and paleoceanographic records, enabling the scientific ocean drilling community to propose and test more refined hypotheses regarding the causes and consequences of climate change.

This special issue of *Oceanography* highlights several significant recent advances toward reconstruction of ice sheet variations in the context of climate change, in our understanding of the processes that affect monsoon variations, in the impact of climate change on sea level rise, and in understanding the causes of large amplitude paleoclimate perturbations such as droughts on land.

The International Ocean Discovery Program Science Plan for 2013–2023 (https://www.iodp.org/about-iodp/iodp-science-plan-2013-2023) identified *Climate and Ocean Change* as one of the four critical themes in which scientific ocean drilling could lead to transformational discoveries and advances. That plan identified four climate challenges for the program to address: How does Earth's climate system respond to elevated levels of atmospheric CO_2? How do ice sheets and sea level respond to a warming climate? What controls regional patterns of precipitation, such as those associated with monsoons or El Niño? How resilient is the ocean to chemical perturbations?

As we address these questions, we are entering a new phase of scientific ocean drilling that requires significant improvement to the spatio-temporal resolution of subseafloor data so that they are comparable to those used in state-of-the-art climate models.

– Debbie Thomas