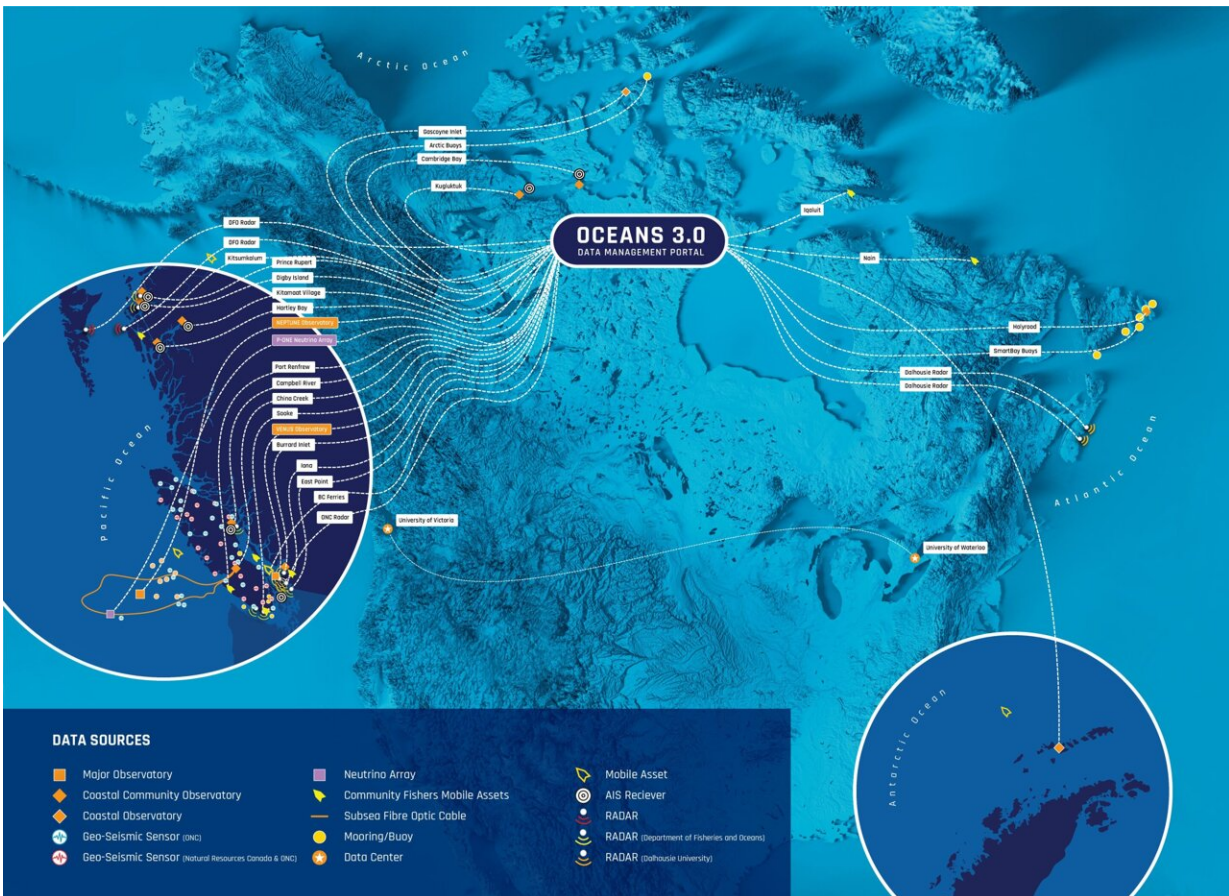


Solar storm detected in deep sea observatories

May 16 2024



Ocean Networks Canada infrastructure map. ONC operates world-leading observatories in the deep ocean, coastal waters and land of the Pacific, Atlantic and Arctic coasts of Canada, and in the Southern Ocean. ONC's cabled observatories supply continuous power and internet connectivity to scientific instruments, cameras and 12,000-plus ocean sensors. ONC also operates ocean mobile and land-based assets, including coastal radar. ONC provides continuous

live ocean data accessible through the Oceans 3.0 data portal on the ONC website. Credit: University of Victoria

The powerful solar storm driving the aurora borealis over global skies last weekend was also triggering the movement of compasses deep in the ocean, as revealed in new scientific findings shared today by Ocean Networks Canada (ONC), a University of Victoria initiative.

ONC's subsea observatories on the west and east coasts of Canada recorded the temporary distortion of the Earth's [magnetic field](#) on instrument platforms deployed as deep as 2.7 kilometers under the ocean surface, potentially some of the most remote recordings ever captured.

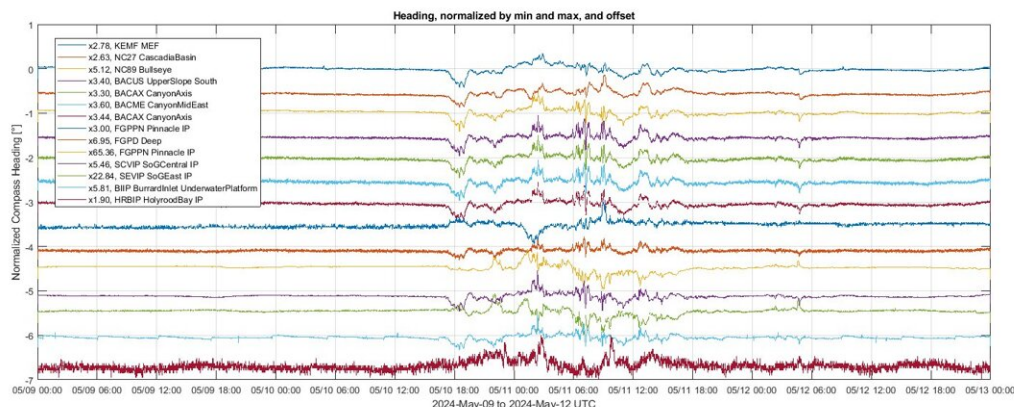
The most significant magnetic shift moved the direction of the compass within a range of +30 to -30 degrees and was recorded at a depth of 25 meters at the Folger Passage subsea site, which is part of the ONC NEPTUNE cabled observatory off the coast of Vancouver Island.

Geomagnetic disturbances can pose risks to power grids, satellite networks, and [navigation systems](#) as well as impact animals' own navigational abilities.

"The reach of these data recordings kilometers under the [ocean surface](#) highlight the magnitude of the solar flare over the past weekend and suggest that the data may be useful for better understanding the geographic extent and intensity of these storms," says Kate Moran, ONC president and CEO.

The discovery of these solar storm magnetic disturbances happened during [data quality](#) control checks. ONC primarily uses compasses to orient its Acoustic Doppler Current Profilers (ADCP) instruments which

measure ocean currents.



Compass data captured by ONC's major cabled subsea observatories VENUS and NEPTUNE off Vancouver Island, at Burrard Inlet on the Pacific Coast, and at Conception Bay on the Atlantic coast shows the magnetic field distortion occurring during a solar storm from May 10–12 (UTC), 2024. Credit: Ocean Networks Canada

Alex Slonimer, a scientific data specialist at ONC, was completing a daily check on the data in late March when he first noticed an anomaly in the numbers showing up in the [Ocean 3.0 Data Portal](#).

"I looked into whether it was potentially an earthquake, but that didn't make a lot of sense because the changes in the data were lasting for too long and concurrently at different locations," Slonimer explains. "Then, I looked into whether it was a [solar flare](#) as the sun has been active recently."

This past weekend's much larger solar storm event reinforced the observation, he adds, with the peaks in the compass headings closely

correlated to the peaks in the visible activity in the aurora.

Justin Albert, professor of physics with UVic's Department of Physics and Astronomy, welcomes the new subsea geomagnetic detections.

"The next two years will be the peak of the 11-year [solar cycle](#). After a decade of relative inactivity, aurora events like this past weekend are likely to become more frequent over the next couple of years, although solar variability makes precise prediction of such events impossible," says Albert.

"ONC's network might provide a very helpful additional window into the effects of solar activity on the Earth's terrestrial magnetism."

Provided by University of Victoria

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