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High-Frequency Radar detection of a possible meteo-tsunami in British Columbia, Canada

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Tsunami detection is an emerging application of high-frequency radars, which have been routinely used for four decades to measure ocean surface currents in coastal areas. Today, some commercial radar systems propose a real-time tsunami detection capability along with the standard oceanographic software. One such radar system has been recently installed in Tofino (Vancouver Island, BC), which provides a synoptic mapping of radial surface currents off of the Canadian Pacific West Coast, with a 120 degrees angular opening and a maximum range of 85-100 km (depending on sea state).

For the first time in the short history of HF radar tsunami detection, a real-time tsunami alert was triggered around 6 am UTC on October 14th, 2016. This alert occurred during a series of severe storms, which reached the West Pacific Coast of Canada and USA in the remains of the Songda Typhoon. There was no report at that time of any seismic activity, which could have induced a local tsunami, and this alert therefore seems to have been triggered by ocean currents of purely atmospheric origin, possibly caused by a meteo-tsunami.

We present an in-depth study of this event combining geophysical data, realistic state-of-art tsunami propagation modeling, and the field of radial surface currents derived from the HF radar measurements. The a posteriori analysis of radar data is performed in light of a recently improved algorithm for tsunami detection, which confirms that the conditions of an alert were clearly met. We try to elucidate the nature of this atmospheric phenomenon and discuss the possible occurrence of a meteo-tsunami.