



Eruptions and ships

Paul Cragg calls for increased awareness of the maritime influences of volcanism

Over the years, many hours and thousands of dollars have been devoted to determining volcanic hazards to aircraft; as far as I can find, comparatively little time or resources have been spent assessing the effects a volcanic eruption might have on a ship or the maritime industry. I can find no documented airplane crash or loss of life in an aircraft directly caused by volcanic activity, but there have been hundreds of lives and tens of ships lost at sea through eruptions, such as that of Mount Pelée in Martinique, the Caribbean, in 1902.

Economically the airline industry has seen some losses due to volcanic eruptions, particularly during the Eyjafjallajökull volcano crisis in 2010. Shipping has many documented losses, both physical and economical, over the last few thousand years. These include loss of life, ships and their cargoes, port closures and infrastructure damage.

Seafarer

As a professional seafarer the dearth of information on how my crew and ship might be affected should we encounter an erupting volcano worried me, so I decided to do my own research. What hazards are we talking about?

Subaerial eruptions are often associated with tephra fallout and pyroclastic density currents. This reduces visibility and, given the extremely erosive properties of tephra, may damage equipment. Ships would have to rely on radar and GPS for collision avoidance and position fixing—how would this equipment be affected? Tephra fall on the ship's structure and cargo will affect the vessel stability, but would this be catastrophic? Tephra may be entrained into the main engines, but to what consequence? Will pyroclastic density currents capsize a ship if they hit it?

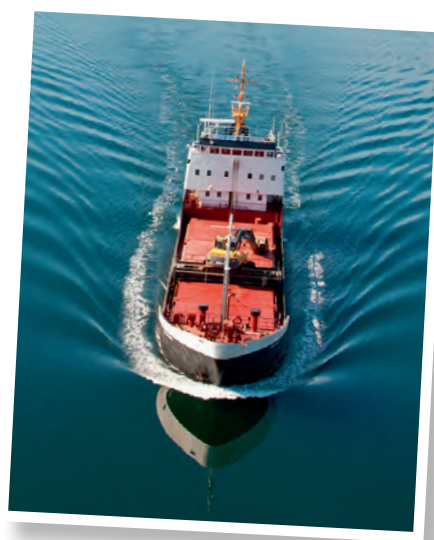
Submarine eruptions may take on a number of different surface expressions, from gas emissions to floating tephra or violent

Surtseyan eruptions. Would gas or rising and floating pumice seriously affect a ship's stability? What influence would a nearby violent eruption have on the structure of a modern vessel? Are pumice rafts likely to be thick enough to inhibit the passage of a vessel? Could gas-emission rates be sufficiently high as to lead a ship to sink?

Additional hazards or risks might include seismically induced shifts on shore or the seabed. Tsunami waves can capsize ships and wash them ashore. Dense lahars can break ships clear of their moorings and the density change in the water may lead to capsize.

Risk assessment

In the past few decades, shipping traffic has accelerated dramatically due to the demand for global trade and, during volcanic eruptions, relief to affected communities may involve boats. It is essential to quantify the effect of volcanic eruptions on ships, to both assist the Captain in making meaningful risk assessments and to aid crisis management, leading to more effective organisation and utilisation of resources.



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“ IT IS ESSENTIAL TO QUANTIFY THE EFFECT OF VOLCANIC ERUPTIONS ON SHIPS ”

PAUL CRAGG