

Rogue waves occurred in the World Ocean from 2011 to 2018 reported by mass media sources

E.G. Didenkulova (Shurgalina)

Institute of Applied Physics of the Russian Academy of Science, Russia

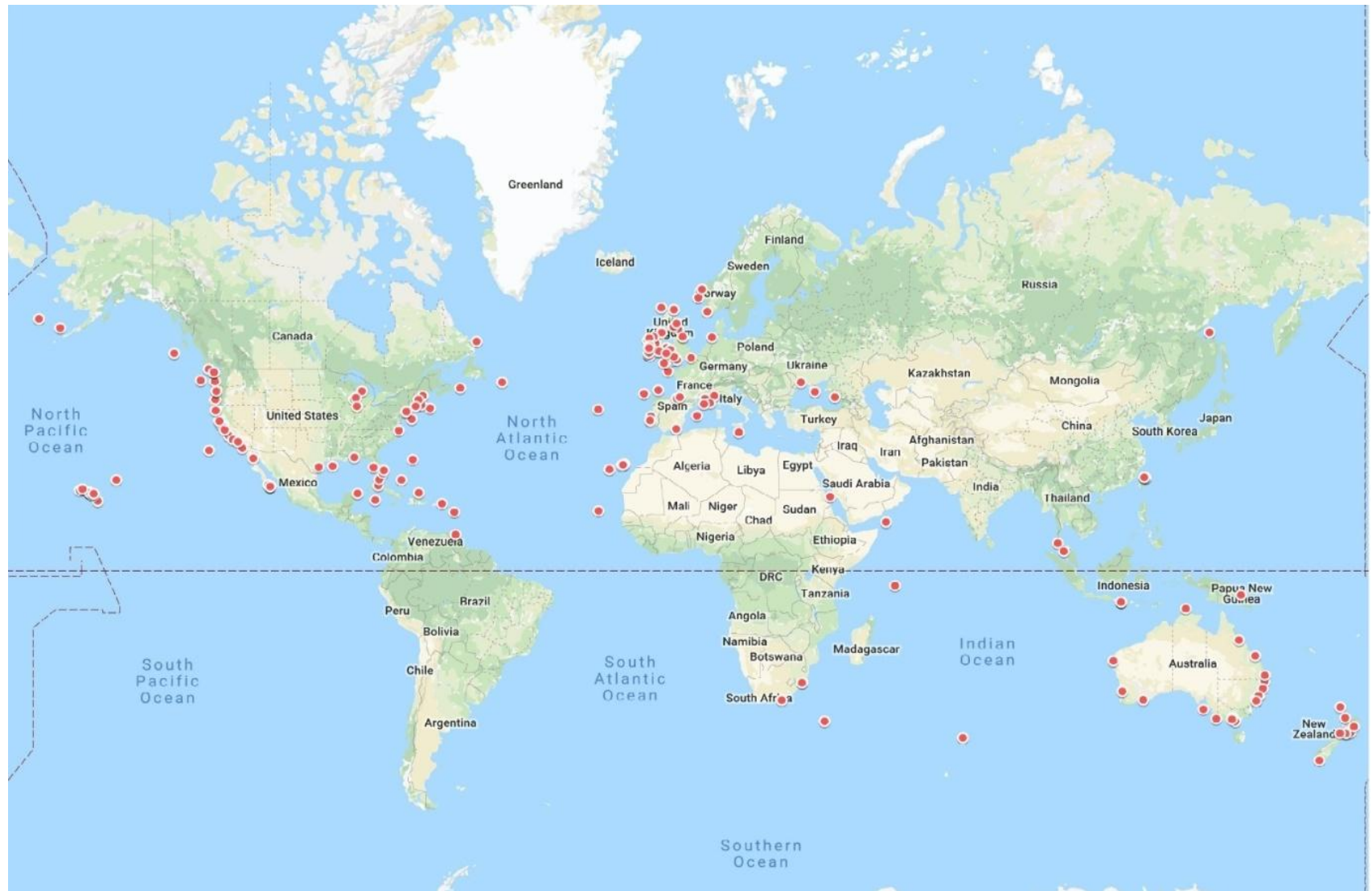
Abstract

A catalogue of anomalously large waves (rogue or freak waves) occurred in the World Ocean during 2011-2018 reported in mass media sources and scientific literature is compiled and analyzed. It includes 210 hazardous events caused damages or human losses. The majority of events is based on eyewitness accounts, and as a rule is not confirmed by direct measurements. All collected events divided into deep water cases, shallow water cases and occurrences on the coast (gentle beach or rocks). The following parameters are determined: date, location, damage, description, reference, and weather conditions. The most dangerous areas in the World Ocean in terms of freak waves are highlighted.

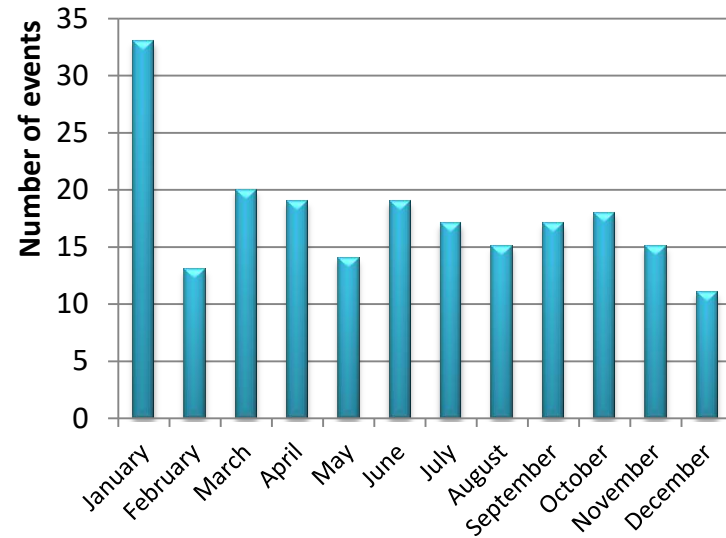
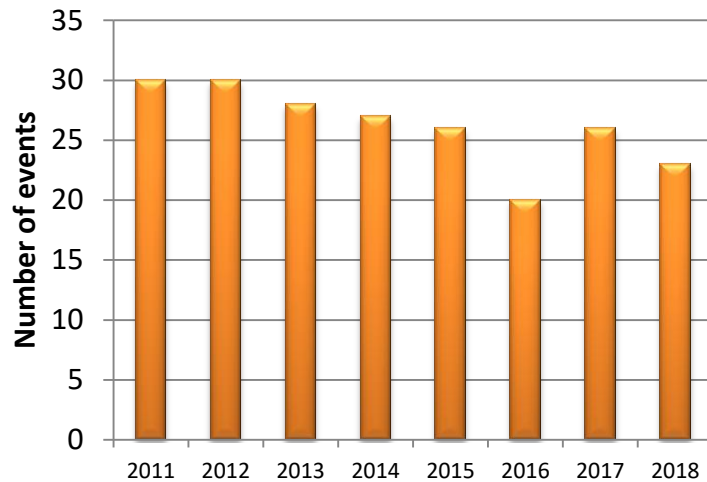
Methodology

All collected events are mostly based on eyewitnesses' accounts, not direct measurements. That is why it could not be considered as exact scientific data. Nevertheless, such statistics shed light on the most dangerous areas in the World Ocean from the point of view of unexpected abnormally large waves, their circumstances, and the scale of the damages and human losses they cause. Obviously, the database does not include all such events, but only those which could be found on the Internet.

The map of locations of rogue wave events in 2011-2018



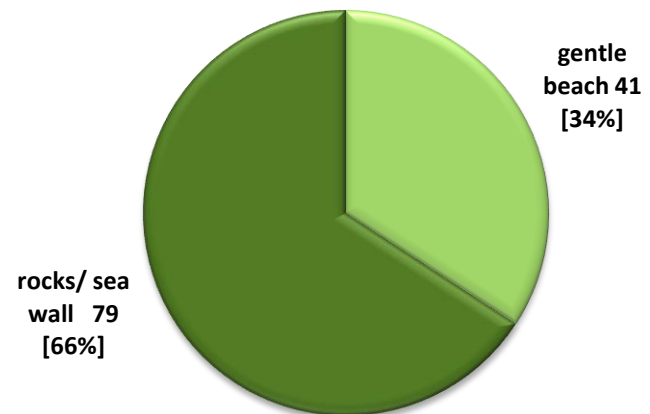
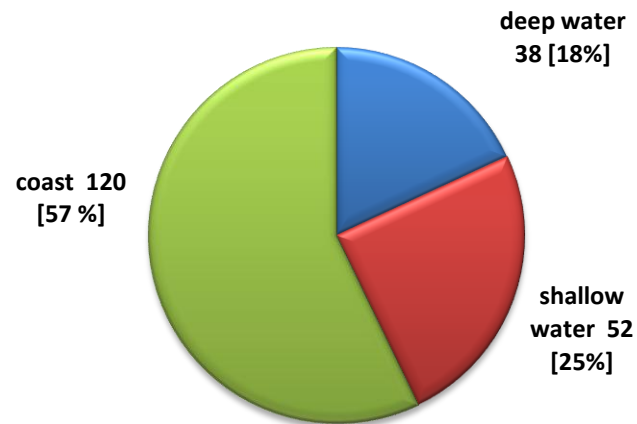
Annual and seasonal variability of freak waves in 2011-2018:



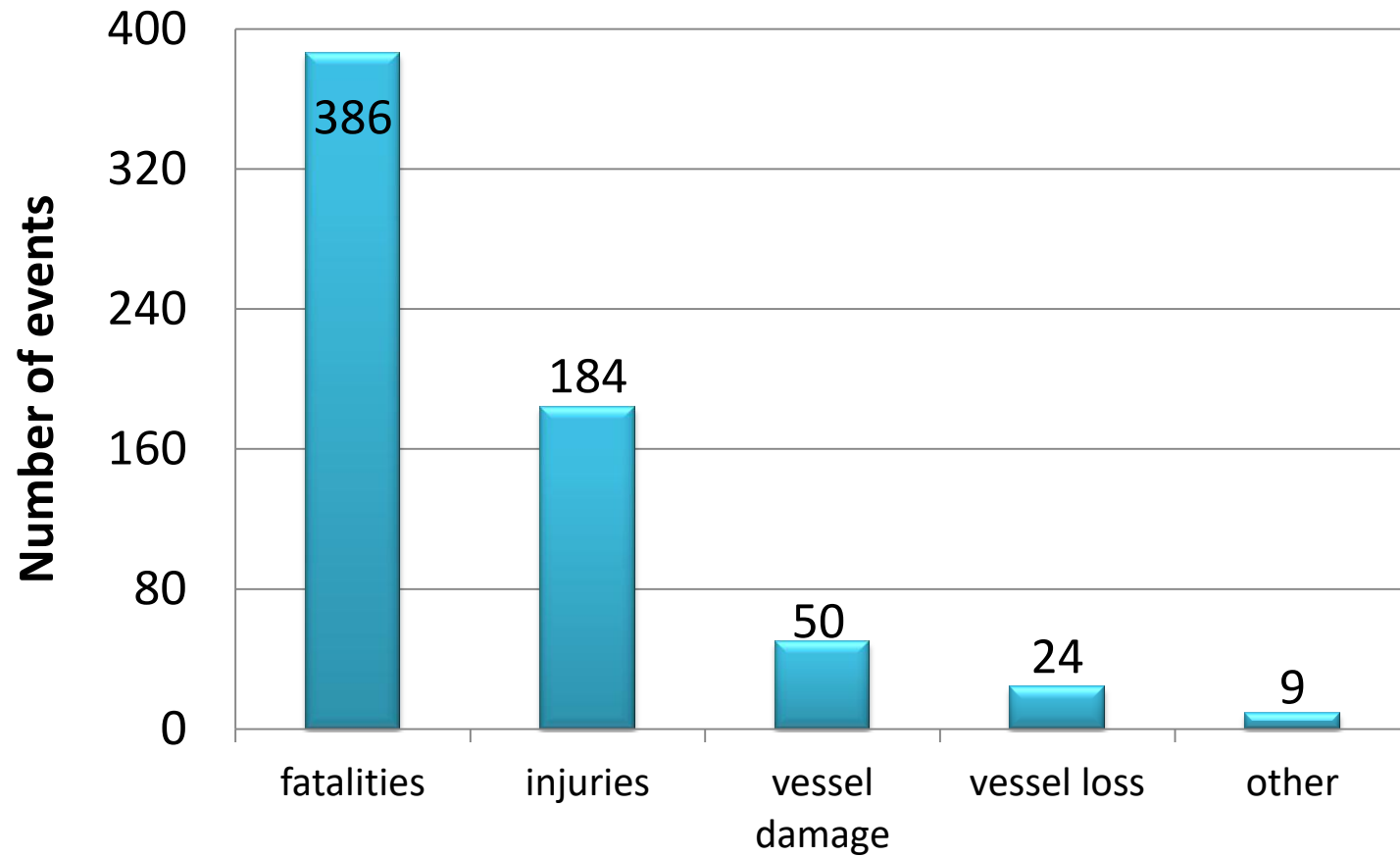
Number and proportion of rogue wave:

a) occurred in deep and shallow waters, and at the coast,

b) occurred at the coast



Damages caused by freak waves in 2011-2018



Examples of lost or damaged vessels after rogue wave incidents:

- a) The ferry “Rabaul Queen” capsized and later sunk after being hit by three rogue waves on 02.02.2012,
- b) Vessel “Drifa” was hit by a rogue wave at the German bight (North Sea) on 29.10.2017,
- c) Passenger ship "Trollfjord" was hit by a giant wave on 18.10.2017, so that many of the passengers were thrown over,
- d) Cruise ship “Divina” was hit by freak wave on 26.11.2015 while en-route from San Juan Puerto Rico to Nassau Bahamas

a)



b)



c)



d)



Example of coastal rogue waves:

Sydney's Royal National Park on 09.01.2016



Newcastle Ocean Baths (Australia) on 16.02.2018



Damages by rogue waves:



Conclusions

The catalogue includes 210 rogue events more or less corresponding to the rogue wave description. All collected waves were unexpected and exceptionally high, caused human death/injury, vessel damage/submerges, or other damages. The database includes 120 coastal rogue events (57 %), 52 cases of rogue waves in shallow water (25%), and 38 cases of rogue waves in deep water (18%). According to the collected statistics, the rogue waves for the period 2011-2018 killed 386 people, injured 184 people, sank 24 vessels and damaged 50 vessels.

- most often rogue waves caused damages on the shore (on stones or cliffs, when a sudden abnormally large wave washed people into the sea);
- most often the rogue wave was single (sometimes in the form of a wall of water), in rare cases two or three abnormally large waves are mentioned;
- the areas where rogue waves are most frequently observed also roughly coincided (the western and eastern coasts of the United States, the coasts of Ireland, Hawaii, New Zealand, and the coast of Australia).

See for more details:

Didenkulova E. Catalogue of rogue waves occurred in the World Ocean from 2011 to 2018 reported by mass media sources. Ocean & Coastal Management. Volume 188, 2020, 105076