

C-CORE 1.13 Squalls

Squalls

Challenge

Challenge ID	C-CORE_OFF1.13
Title	Squalls
Challenge originator:	
General Description	
What data/products do you use?	The identification of squalls, as a characterization of transient 10m wind speeds, is essentially limited to surface-based observations, as reported from ships and buoys. The historical records of observed squalls are available via ICOADS. In addition, historical observed squall data are also available from a small number of proprietary measured data sets as indicated in paragraph C. 3.2 of ISO 19901-1:2005(E). Real-time and near real-time observations of squall data, when observed and reported, are available from many sources including NOAA (NWSTG), NOAA (MADIS), NOAA (NDBC), UCAR, and numerous other data distribution centers.
When do you use this kind of dataset?	Observations of squalls are used by the O&G industry in squall prone areas for all phases throughout the O&G cycle, except strictly operational tasks. The onset of these events can be sudden and interrupt all kinds of operations on deck, helicopter activity, heavy lifts etc. Historical data are important to assess risk of operations in these areas, frequency of occurrence, strength of gusts etc. Also, many other data sources do not catch the extremes in the area without these data added to the time series for the point of interest, since data often are averaged and conditions often are mostly benign. The data sets are used to assist in (a) qualifying and quantifying the means and extremes of squalls, and (b) managing risks related to squalls, safeguarding lives, protecting assets, and conducting operations. The data set is used to assess operability in the area, to reduce risk when designing structures and operations, to design strategies to avoid severe conditions.
What are your actual limitations and do you have a work around?	Squall lines can often be identified from satellite pictures. But the intensity of the convective cell is hard to assess. The temporal and spatial resolutions of surface-based observations significantly limit the identification of squalls, as a characterization of transient 10-meter wind speeds. Unless ships or buoys measure and report squalls, the phenomena are not readily available for analysis over vast areas of the ocean. Hence warnings are based on modelled data and spotting of convective cells instead, not too accurate and might lead to downtime when it is not needed.
Needs and expectations on EO data	EO is used for this today, to spot convective cells and try to assess they movement. However, it is hard to assess the wind speed of each individual cell based on satellite data. Also, the direction of movement for each individual cell is often hard to predict. This leads to unnecessary downtime because of warnings. Specific need: Continuous time series of 10m wind speed data in the offshore environment.

Challenge classification	
Pre license	1
Exp.	3
Dev.	3
Prod.	4
Decom.	2
Geographic context/ restrictions	Applies to all six Areas of interest. Seasonality: Applies to all seasons.
Topographic classification / Offshore classification	Ocean
Activity impacted /concerned	
Technology Urgency	Short term (2-5 years)
Information requirements	
Update frequency	Hourly or 15 mins. Available: Real-time or near real-time observations are available sub-hourly and less frequently. Historical observations are generally updated once per month, for the previous month.
Temporal resolution	At least hourly. Available: Sub-hourly and less frequently.
Spatial resolution	4-2 km Available: Observations are available based on the location of the ship observation, therefore the spatial resolution varies greatly.
Data quality	The selected sources in this document are selected because they are known to have sufficient quality (after some work arounds and adaptations). In general separate indepth verification studies has to be made for each source planned to be used for analysis, and the analysis has to be repeated for each geographical area (since sources might be of sufficient quality in one area but not another).
Data Coverage and extent	Regional
Example format	Surface-bases observation: text, CSV and/or netCDF
Timeliness	Hourly/15 mins. Hourly or more frequent. Forecasts are normally issued 2 to 4 times per day, warnings when thresholds are passed. But O&G users and forecasters are monitoring conditions continuously.
Existing standards	Paragraph 2.4.3.3 of DNV-RP-C205 discusses a possible modeling solution for squalls, based on vertical wind profiles, but it is not necessarily applicable beyond the Norwegian Sea. Paragraph 7.4 of ISO 19901-1:2005(E) states: The concept of a wind spectrum is only applicable to steady wind conditions. As squalls are not steady, the time and spatial variation of the wind speed in a squall cannot be described by a wind spectrum. Analysis of actions and action effects caused by squalls requires the specification of a time series of wind velocity.

Relevant products

Content by label

There is no content with the specified labels