SAFESEAS Overview

- What is SAFESEAS?
- Background Monitoring
- Table and D-2D Display Features
- Localization
- Customizing SAFESEAS
- The Future of SAFESEAS
SAFESEAS is a set of applications in the National Weather Service’s Advanced Weather Interactive Processing System (AWIPS).SAFESEAS continuously monitors marine and adjacent overland conditions for specific marine weather hazards. It automatically alerts NWS forecasters whenever such conditions are detected, and provides interactive graphic user interfaces with which the forecaster can easily investigate the data.
SAFESEAS Overview

What is SAFESEAS?

- Database
- D-2D
- AWIPS
- SAFESEAS
- Observations
- Marine warnings and advisories
- Forecaster
SAFESEAS Overview

What is SAFESEAS?

SAFESEAS uses the same approach as SCAN – a persistent background monitor coupled with an interactive D-2D display.
The SAFESEAS Alert button provides configurable, worst-case monitoring, even if SAFESEAS displays are not in use. This is an example of the SCAN monitoring concept.
SAFESEAS Overview

Table and D-2D Display Features

Interactive Table and D-2D display.
The SAFESEAS Table initially displays the worst-case conditions in each county or zone. Each column can be sorted by value. Selecting a county/zone name will provide information for that area. Letters in the cells aid color-blind forecasters.
The selected area’s observation data points will be displayed. The D-2D map will zoom into the area.
24-Hour trend graphs are available for most parameters. Color levels correspond to those in the table.
Parameters dependent on multiple values can be represented by a series of trend graphs.
Directional parameter trends are represented by hodographs.
### SAFESEAS Overview

#### Table and D-2D Display Features

The Observation History Table provides trends in tabular form.

<table>
<thead>
<tr>
<th>Station ID: 4600S</th>
<th>Station Name: Marine</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Time (UTC)</th>
<th>Lat (deg)</th>
<th>Lon (deg)</th>
<th>Significant Wave Hgt (ft)</th>
<th>Primary Swell Hgt (ft)</th>
<th>Primary Swell Dir (deg)</th>
<th>Primary Swell Per (sec)</th>
<th>Pressure (in)</th>
<th>P Tendency (in)</th>
<th>Wind Spd (kt)</th>
<th>Gust (kt)</th>
<th>Vis (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:30 Feb B2</td>
<td>31.21</td>
<td>132.27</td>
<td>517</td>
<td>31.28</td>
<td>31.26</td>
<td>31.29</td>
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<td>132.27</td>
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</table>
SAFESEAS multiload provides a conventional observation display, differentiated in color by station type.
SAFESEAS localization will be centered around each forecast offices County Warning Area. The localization will set up monitoring for the home county warning area, the neighboring County Warning Areas from maritime forecast offices, and the marine zones covered by those forecast offices.
SAFESEAS Overview

Customizing SAFESEAS -- Display Thresholds

Display Threshold Configuration Tool allows users to customize the levels at which the table parameters change color.
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Customizing SAFESEAS – Monitoring Area

SAFESEAS provides a tool for customizing its monitoring area. The forecast office can:

- Add and delete zones and counties.
- Add and delete fixed stations.
- Associate fixed observation stations with zones and counties.
SAFESEAS provides a tool for customizing the monitor thresholds. Thresholds are zone-specific, and so may be customized for each zone individually.
The Fog Monitor uses various algorithms to highlight suspected areas of fog from satellite data. This will be especially helpful in marine zones, where observations are scarce. The first version is being tested for deployment. Point observations will be added in later.
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The Future of SAFESEAS – Fog Monitor

The Fog Monitor algorithms will be highly configurable, to allow users to find the best solution for their environment.
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Fog Monitor Mandatory Thresholds

- **Fog Product [T (10.7\(\mu\)m) – T (3.9\(\mu\)m)]**
  Nighttime threshold setting allows user to adjust the Fog Product’s temperature difference range.

- **VIS (Normalized Count)**
  Daytime range of normalized brightness values.

- **Maximum Cloud Temperature (C)**
  Determines the 10.7\(\mu\)m threshold temperature value which the Fog Monitor uses to decide if it is detecting clouds instead of fog.
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Fog Monitor Optional Thresholds (1)

- **Daytime Ice/Snow vs. Fog Threshold (C)**
  Takes advantage of strong fog scattering properties at 3.9 \( \mu \text{m} \). Helps distinguish bright snowpack from fog.

- **Cool Fog vs. Warm Surface Threshold (C)**
  Sets a 10.7 micron brightness temperature (best in thick fog layers, where the measured layer top is colder than the ground).

- **Daytime Smoothness Threshold (%)**
  Finds areas of uniform brightness (helps distinguish fog from mid-level clouds).
**SAFESEAS Overview**

*Fog Monitor Optional Thresholds (2)*

- **Adjacency Threshold**
  Filtering the suspected fog areas by size. Sets minimum size standards to discount spurious bright pixels.

- **Twilight Angle (deg)**
  Sets the sun angle for “dawn/dusk” area.

- **Fractal Dimension Threshold**
  This is a measure of the “jaggedness” of the edges of the detected area. Useful in identifying linear fog bank boundaries compared to jagged cloud edges (but may also filter dendritic valley/river fog.)
Because of Fog Monitor’s potential impact on marine fog awareness, its output will be available in the SAFESEAS table.
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Upcoming Enhancements(1)

New parameters:

Wind Direction, Temperature, Dewpoint, Sea Level Pressure, Sea Surface Temperature, Wave Steepness.

Wind Max renamed to “Peak Wind”
### SAFESEAS Overview

#### Upcoming Enhancements (2)

**Resizable Table**

Instead of having a fixed number of visible zones/counties, the OB7 SAFESEAS table will allow the user to resize it by “dragging”.

![Resizable Table Image](image-url)
Attributes Menu

Users will be able choose which attributes to display in the SAFESEAS table. This functionality has been adapted from the SCAN table.
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Upcoming Enhancements(4)

- Additional SAFESEAS enhancements being tested:
  - Inclusion of MAROBS in SAFESEAS
  - Redesigned SAFESEAS configuration GUI

- Additional SAFESEAS/Fog Monitor enhancements approved:
  - Improved cursor sampling in table
  - Inclusion of gage depth values.
  - Inclusion of point observations in Fog Monitor (step toward becoming a general visibility monitor).
  - Implementation of statistical calculations in Fog Monitor
  - Observed vs forecast value comparisons??
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Future Projects

Visibility

Fire Weather

Blizzards and Ice Storms

Rip Currents
SAFESEAS Overview

**SNOW – SAFESEAS for Winter Weather**

- System for Nowcasting of Winter Weather.
  - Using SAFESEAS approach for winter weather problems.
  - Shut down and removed from D-2D menu with a few quick steps!
SAFESEAS Overview

Future Projects – Rip Current Monitor

Rip Currents

Contributing Factors:

1. On-shore wave characteristics
2. Water levels
3. Surf zone bathymetry

Source: www.ripcurrents.noaa.gov
SAFSEAS Overview

Future Projects – Rip Current Monitor(2)

Seasonal Distributions of Rip Current Rescues and Wave Heights in Palm Beach, FL

Sources: Dr. C.S. Wu (NWS) & Prof. Robert Dean (University of Florida), 2003
SAFESEAS Overview

The future of SAFESEAS

Visibility (enhanced Fog Monitor)

“Obs Monster? ”

Fire Weather

Blizzards and Ice Storms (SNOW)

SAFESEAS

Rip Currents