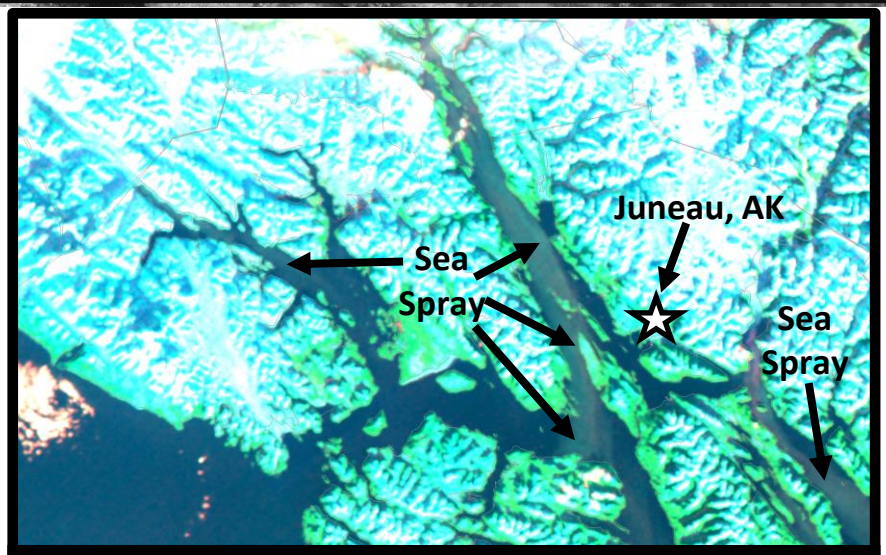
VIIRS Sea Spray RGB

Quick Guide

Why is the VIIRS Sea Spray RGB Important?

The 375-m VIIRS Sea Spray RGB monitors sea spray aerosols over large and small bodies of water. In the air, sea spray aerosols can remain suspended for a period of time: spanning from seconds-to-days depending on the aerosol size. For marine vessels traversing through the high latitudes in the cold season, freezing sea spray is a hazard. The rapid accumulation of ice on vessels can lead to capsizing, resulting in the loss of life and property.



VIIRS Sea Spray RGB at 2036Z, 6 January 2022; satellite overpass observes offshore sea spray within the inner channels near Juneau, Alaska.

VIIRS Sea Spray RGB Recipe

Color	Band (µm)	Min-Max Gamma	Physically Relates to…	Small contribution to pixel indicates….	Medium contribution to pixel indicates…	Large contribution to pixel indicates…
Red	3.7 (I4) - 11.45 (I5)	0°C to 10°C 1.0	Reflectance of clouds, aerosols, and surfaces	Clear ocean surface	Sea spray, land surface	Clouds
Green	0.86 (I2)	1 to 20% 0.6		Clear ocean surface	Sea spray, thin clouds, vegetation	Thick clouds, snow cover, vegetation
Blue	0.64 (I1)	2 to 25% 0.6		Clear ocean surface	Sea spray, thin clouds, turbid waters	Thick clouds, snow cover, vegetation

Impact on Operations

Primary Application

Sea Spray: The RGB's high spatial resolution provides observations of sea spray over bodies of water.

Fills Data Gap: Identifying areas of sea spray can be difficult due to the lack of in-situ observations over the oceans and in the northern high latitudes. The satellite observations provide a way to detect sea spray in data-sparse regions.

Icing: Diagnosing areas of sea spray, which may cause icing depending on environmental conditions, can assist marine vessels in avoiding damage to their ships.

Visibility: High concentrations of sea spray can reduce visibilities over the ocean surface.

Limitations

Clouds: Sea spray occurs near the ocean surface, where clear-sky conditions are needed to view the aerosols.

Freezing Sea Spray? Use this imagery in conjunction with observations of ocean and air temperature to confirm sea spray is freezing sea spray.

Daytime Only: RGB depends on solar reflectance from visible and near-IR bands. Imagery is not available during the nighttime.

Temporal Resolution / Latency: RGB imagery is available ~2x / day per polar-orbiting satellite over CONUS. More frequent passes are viewable in the northern Pacific waters. Data latency is ~30 minutes.

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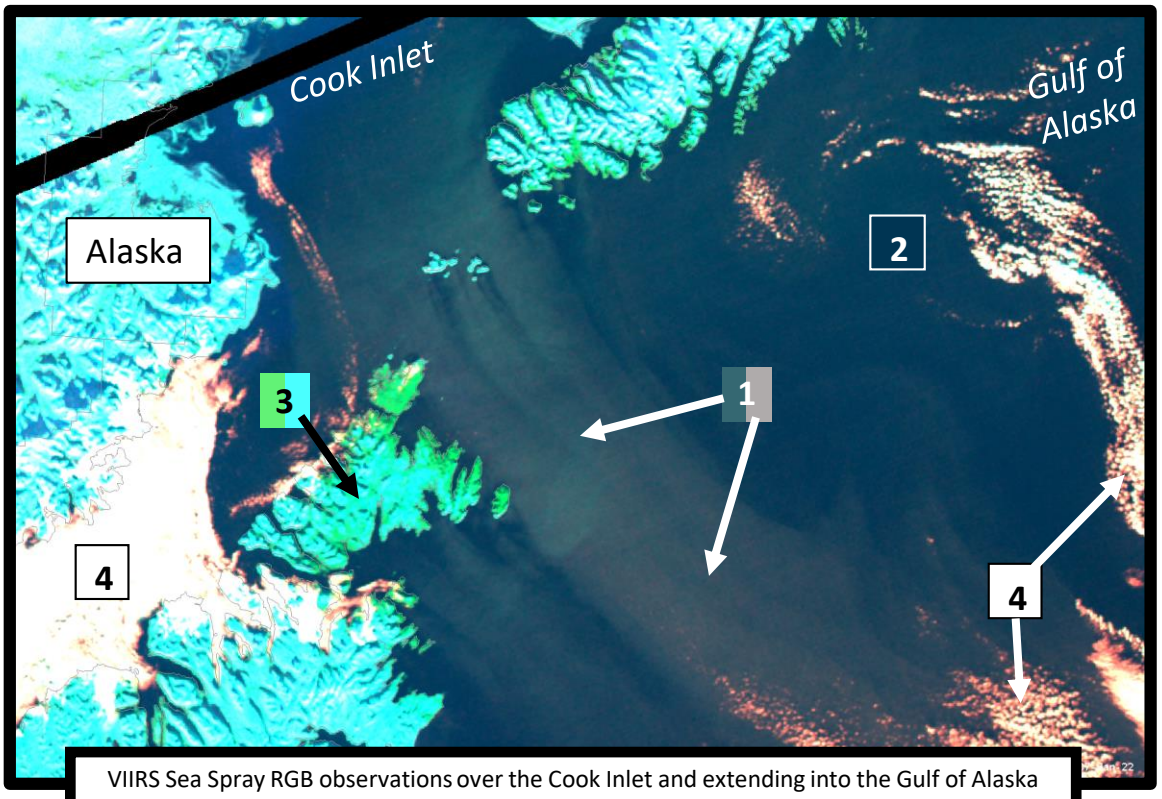
RGB Interpretation

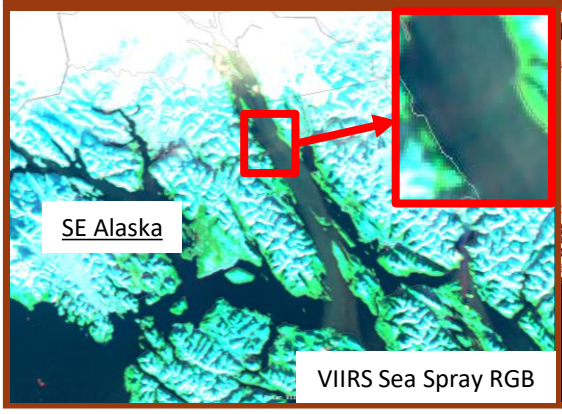
- **1** Sea Spray (medium cyan to gray)
- **2** Ocean Surface (dark blue)
- **3** Land Surface (green to bright cyan)
- **4** Clouds (white)

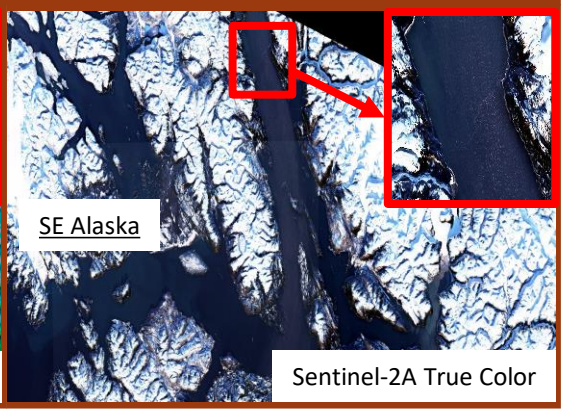
Note: exact colors and scene brightness will vary diurnally, seasonally, and latitudinally.



VIIRS Sea Spray RGB observations over the Cook Inlet and extending into the Gulf of Alaska on 7 January 2022 at 2156Z.

Comparison to Sentinel-2A True Color: The VIIRS Sea Spray RGB is compared to the European Space Agency (ESA) Sentinel-2A True Color. Both RGBs observe the extensive sea spray over the narrow channels in southeast Alaska on 6 January 2022 but the higher resolution of Sentinel is required to see it clearly with the True Color RGB. The aerosols can be seen within the red squares: medium cyan to grey colors in the VIIRS Sea Spray RGB and the 'milky white' color in the True Color imagery. The Sentinel-2A imagery exhibits 10-m spatial resolution while the VIIRS Sea Spray RGB is at 375-m. Conversely, the VIIRS Sea Spray RGB has a finer temporal resolution (i.e., ~4-6 daytime overpasses per satellite in the northern high latitudes) compared to Sentinel-2A that is only available once every five days. Insets are included to observe the sea spray at high resolution.





Resources:

Satellite Liaison Blog

Alaska Sea Spray on 10 Feb 2020

AMS Weather and Forecasting

Using NOAA Satellite Imagery to Detect and Track Hazard Sea Spray in the High Latitudes

Hyperlinks not available when viewing material in AIR Tool