Satellite Data Applications for Offshore Aviation Weather

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Aviation Weather Information Shortfall
Limited Radar Observations Offshore

- NEXRAD Precipitation
- OPC Precipitation

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Overview
- The Offshore Precipitation Capability (OPC) is a system that creates radar-like mosaics of precipitation intensity and echo tops beyond the range of current weather radar
- OPC uses together five Geostationary Operational Environmental Satellite (GOES) channels, global lightning data, and several fields from the National Oceanic and Atmospheric Administration’s (NOAA) Rapid Refresh (RAP) 13 km numerical weather prediction model
- OPC output is merged with radar mosaics over land
- These capabilities will directly benefit the Federal Aviation Administration (FAA) by providing improved situational awareness for offshore air traffic control and management

OPC Multisensor Data Fusion
- Satellite: GOES Imager, Visible and 4 Infrared Channels
- Lightning: Earth Networks Total Lightning Network, Cloud-to-Ground lightning strikes used in OPC
- Numerical Model: Rapid Refresh (RAP) 13 km
- Weather Radar: NEXRAD, Terminal Doppler Weather Radar

OPC in the GOES-R Era
- Earth Networks Cloud-to-Ground Lightning Density (1km)
- Pseudo Geostationary Lightning Mapper (PGLM) Lightning Density (1km)
- OPC with EN Lightning
- OPC with PGLM Lightning
- OPC with Himawari-8 Advanced Himawari Imager (AHI) data to explore impact of increased spatial resolution, number of channels, and image frequency in preparation for GOES Advanced Baseline Imager (ABI)

OPC Precipitation
- Validation data over ocean provided by NASA Global Precipitation Measurement (GPM) Mission Core Observatory Dual-frequency Precipitation Radar (OPPR)
- OPC compared with GPM in Caribbean and Gulf of Mexico for summer 2015
- OPC Precipitation and Storm Heights generally higher than GPM measurements

Summary and Future Work
- The OPC creates radar-like mosaics beyond the range of radar
- Global Precipitation Measurement Multifrequency Precipitation Radar precipitation and storm heights used to validate OPC over the water
- Activities to prepare OPC for the GOES-R era include
  - Using Pseudo Geostationary Lightning Mapper (PGLM) data to anticipate OPC performance with GOES-R GLM
  - Training OPC with Himawari-8 AHI data to simulate GOES-R ABI
  - Investigating GOES-R ABI Cloud Height Algorithm (ACHA) and Joint Polar Satellite System Visible Infrared Imager Radiometer Suite (VIIRS) products for improving OPC