

A faint, light gray topographic map of the world is visible in the background, showing contour lines and landmasses.

AN INTRODUCTION TO CLARA-A3

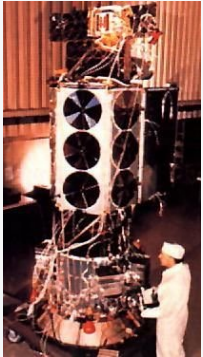
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Presentation at short online CLARA-A3 course 20 September 2023

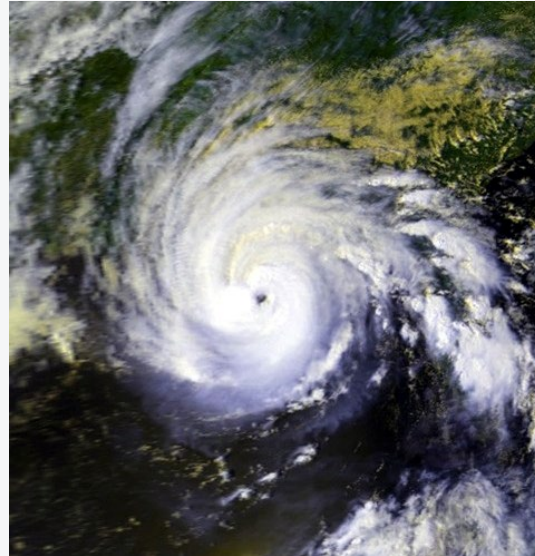
CM SAF objectives

- Compile global and regional scale climate data records (CDRs) from satellite sensors
- Focus on components of the Energy and Water Cycle
- Produce consistent CDRs with longest possible temporal coverage (decades)
- Make CDRs easily accessible to everyone through web user interface

AVHRR: The Advanced Very High Resolution Radiometer



Launch of Tiros-N by an Atlas launch vehicle 13 Oct. 1978.
 Credit: NASA/NOAA

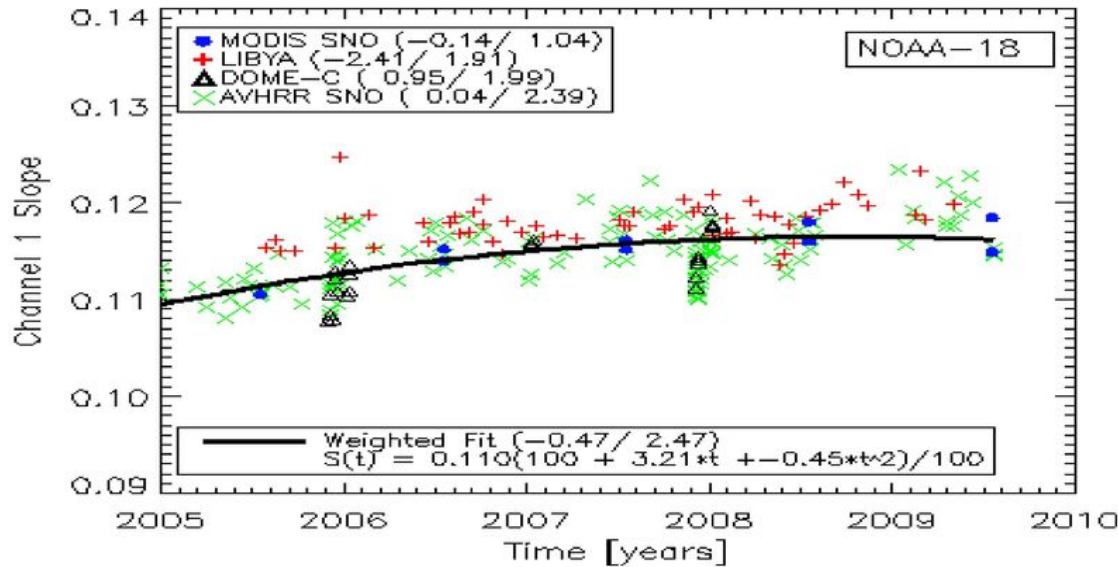


Images from Tiros-N AVHRR
 (hurricane Frederic 12 Sep 1979)
 Credit: NASA/NOAA

AVHRR SPECTRAL BANDS		
Channel Number	Wavelength (um)	Typical Use
1	0.58 - 0.68	Daytime cloud and surface mapping
2	0.725 - 1.00	Land-water boundaries
3A	1.58 - 1.64	Snow and ice detection
3B	3.55 - 3.93	Night cloud mapping, sea surface temperature
4	10.30 - 11.30	Night cloud mapping, sea surface temperature
5	11.50 - 12.50	Sea surface temperature

Longest available time series of observations from a multispectral Imager.
 Support to weather forecasting
(not intended for climate studies)

Efforts to improve suitability for climate monitoring: - Introduction of inter-calibration and time-dependent calibration corrections



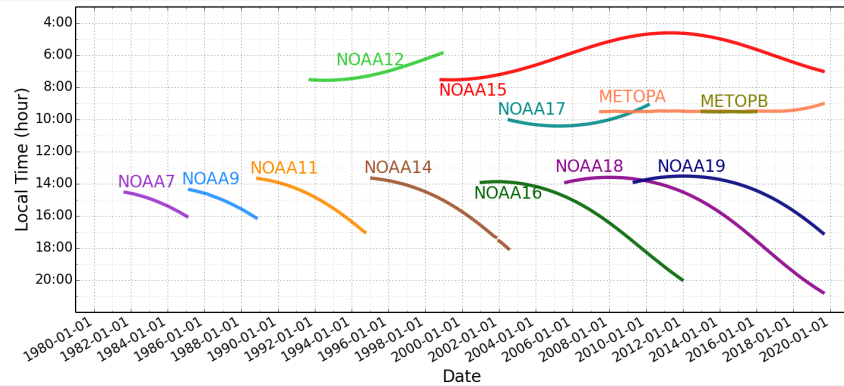
Time dependent slope values for conversion of AVHRR counts in visible channel 1 to reflectances using reference measurements and invariant targets on Earth. Credit: NOAA

The CLARA records – a brief history

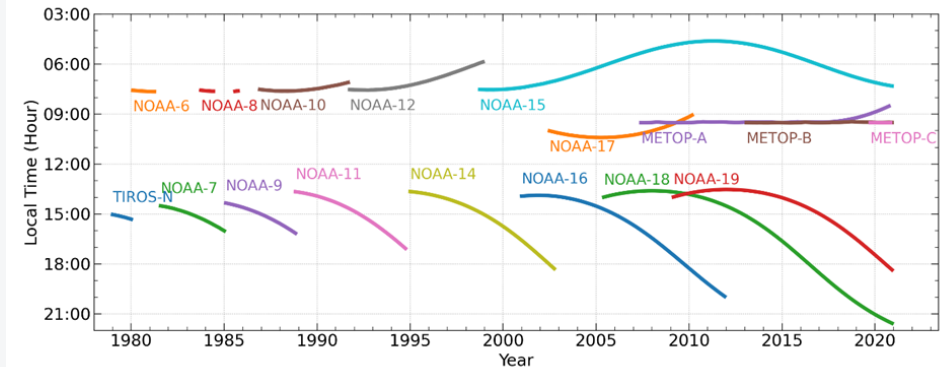
- CLARA: **CM** SAF c**L**ouds, **A**lbedo and **R**adiation
- Global scale climate data records of cloud and energy cycle from the AVHRR optical imager family
- CLARA-A1 released in 2012 (-A for AVHRR)
- CLARA-A2 released in 2017, extended in 2020
- CLARA-A3 released in 2023

Karlsson et al.: CLARA-A3: The third edition of the AVHRR-based CM SAF climate data record on clouds, radiation and surface albedo covering the period 1979 to 2023, Earth Syst. Sci. Data Discuss. [preprint], <https://doi.org/10.5194/essd-2023-133>, in review, 2023.

CLARA-A2 (2017):



CLARA-A3 (2023):



Overview of CLARA-A3 products

Global cloud and radiation products, general characteristics		
Products	Cloud products	Cloud Fraction, Cloud Top Level, Cloud Phase, Liquid Water Path, Ice Water Path, Joint Cloud Histogram
	Surface radiation products	Surface Incoming Shortwave Radiation, Surface Downward Longwave Radiation, Surface Radiation Budget
	Surface albedo products	Surface Albedo Black Sky, Surface Albedo White Sky, Surface Albedo Blue Sky
	TOA	Outgoing Longwave Radiation, Reflected Solar Flux