

Project 2: Tracer transport

Tracer transport in the atmosphere and ocean:

Water vapor, dust, aerosols, plastics

Fluid laboratory: Plastics in the Ocean

Laboratory analogue of ocean 'garbage patches'.

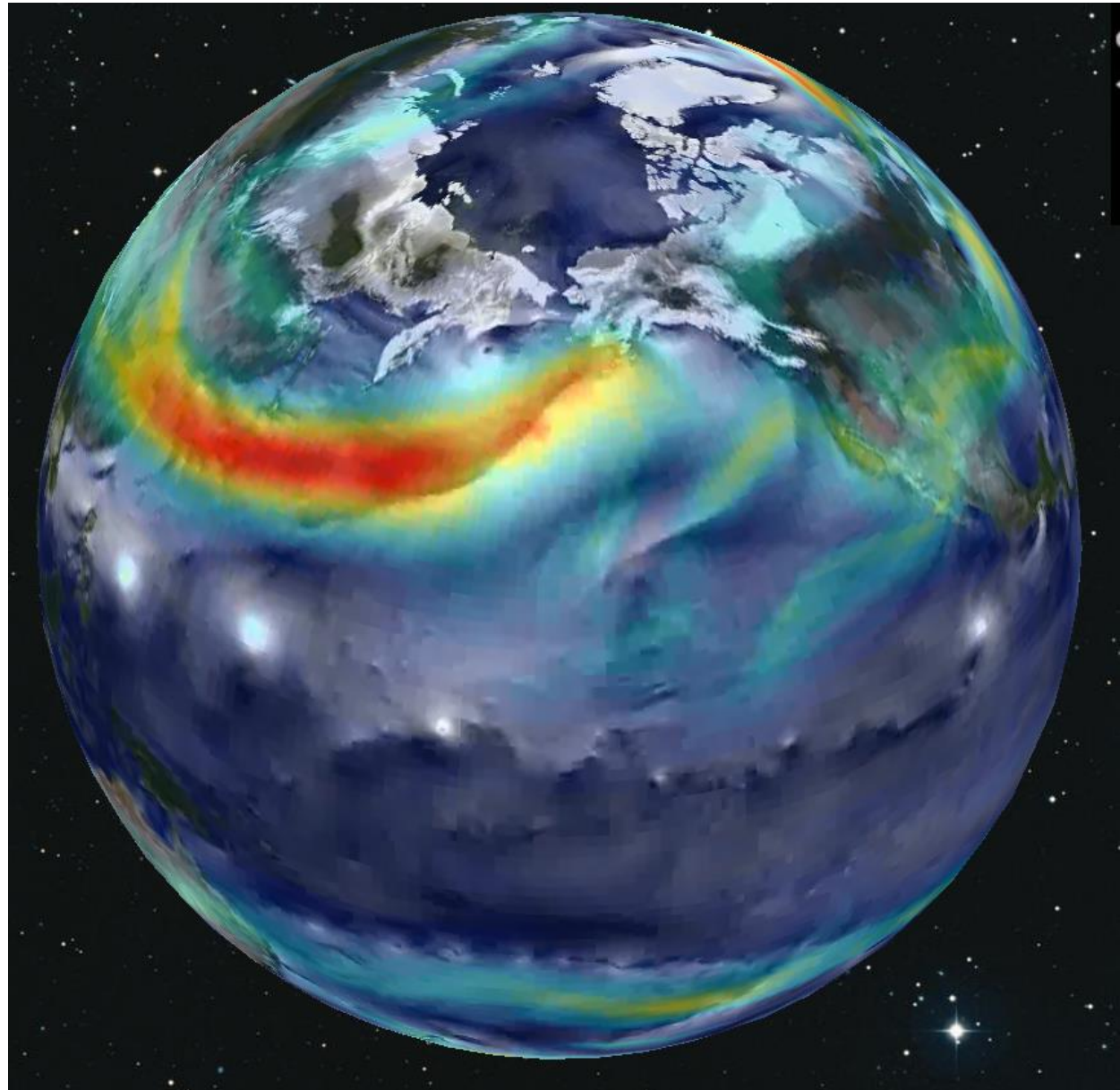
P1- observed winds and balance of forces

Winds

May 2005- May 2007

Surface winds (white 0-40 m/s)
and
upper-level (250 hPa) winds
(colors 0-175 m/s, red=faster).

NASA Goddard Earth Observing System Model
(GEOS-5) – 10 km global simulation – see:
<https://svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=30017>



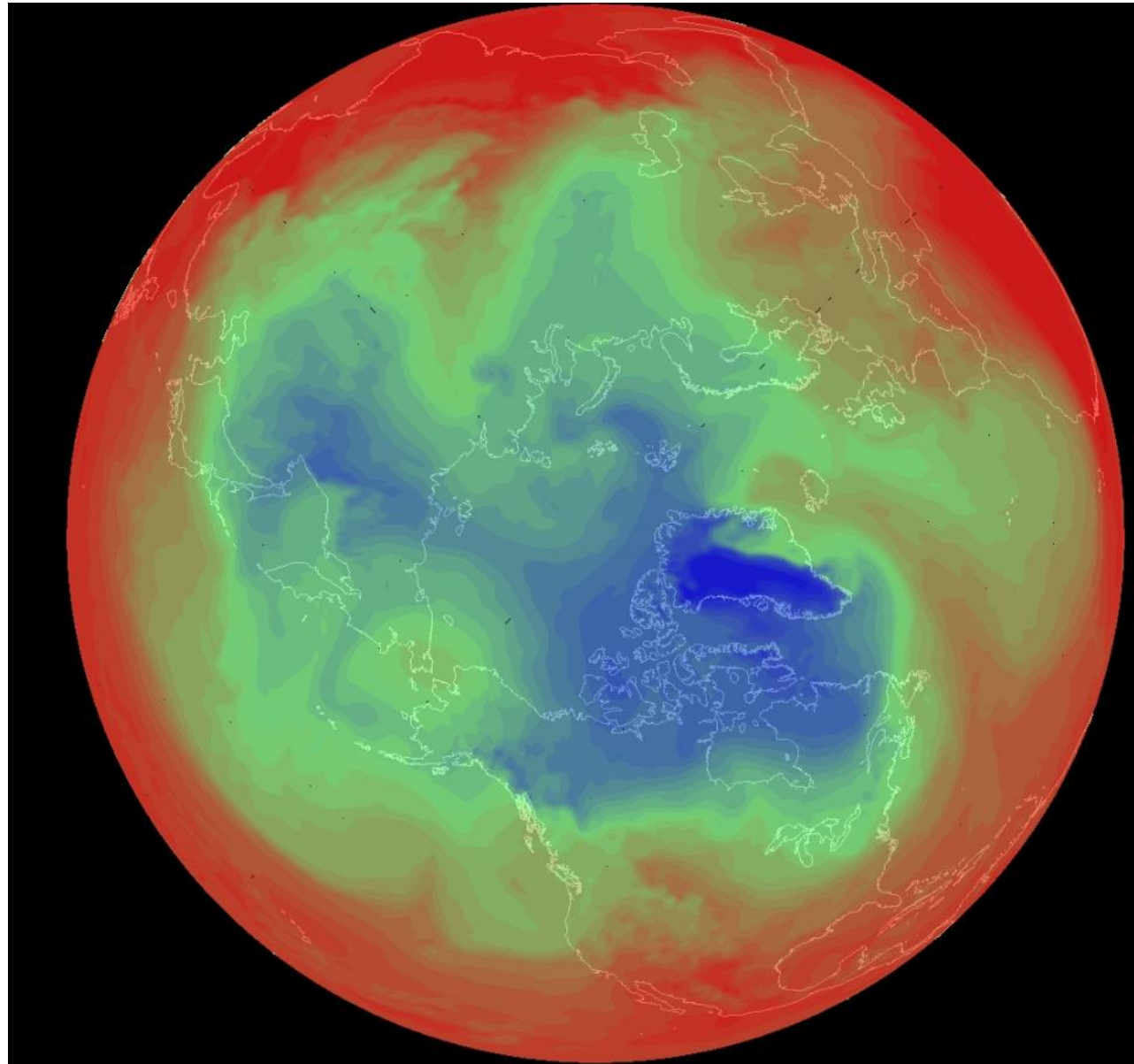
Movie is available on the EsGlobe under
“GEOS-5 Winds”

P2: tracers transport

winds carry their properties as they move around the globe

Temperature
at 850 mb, ~1.5 km

Color scale: red =hot, blue=cold

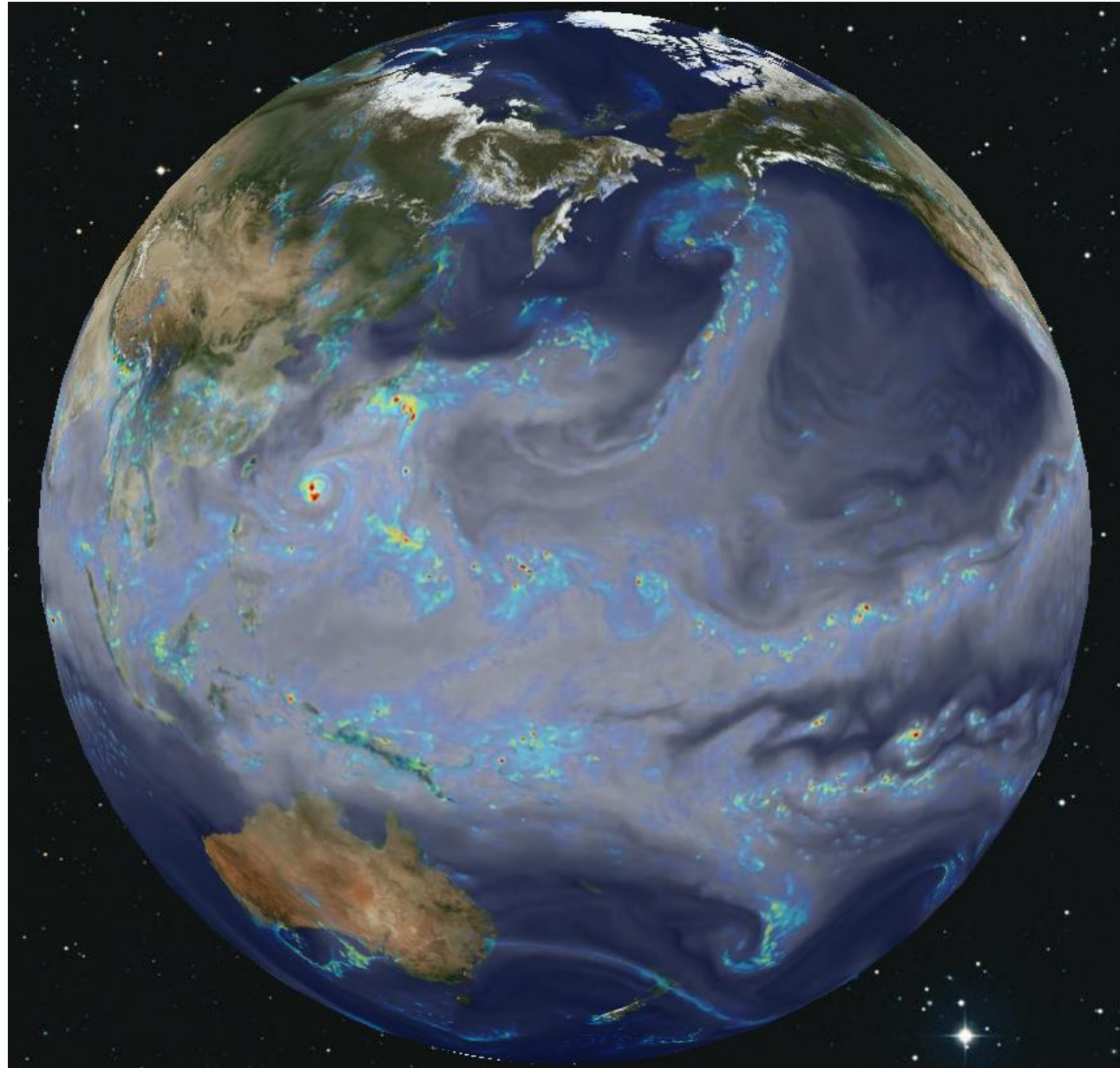


[GFS analyses loop - winter 2009](#)

Water vapor

Total precipitable water (white) and
rainfall (colors 0-15 mm/hr;
red=highest).

NASA Goddard Earth Observing System
Model (GEOS-5) – 10 km global simulation



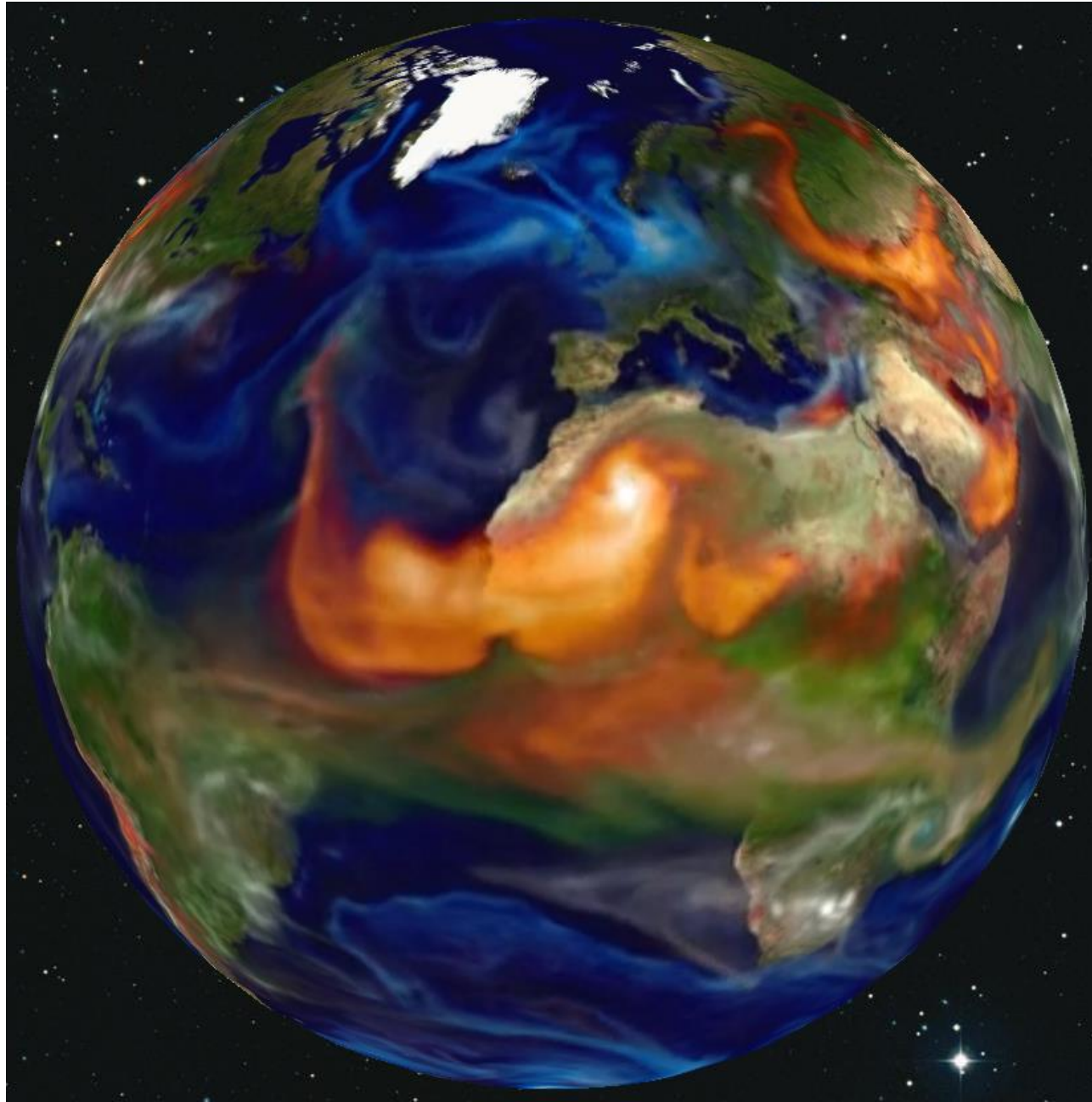
Movie is available on the EsGlobe under
“GEOS-5 Water Vapor”

Aerosols

The colors show four different aerosols:

- grey=sulfate
- green=organic and black carbon
- blue=sea-salt
- red=dust

The simulation uses GEOS-5 and the Goddard Chemistry Aerosol Radiation and Transport (GOCART) Model.



Movie is available on the EsGlobe under "Atmospheric aerosols"

Fukushima radioactive aerosols

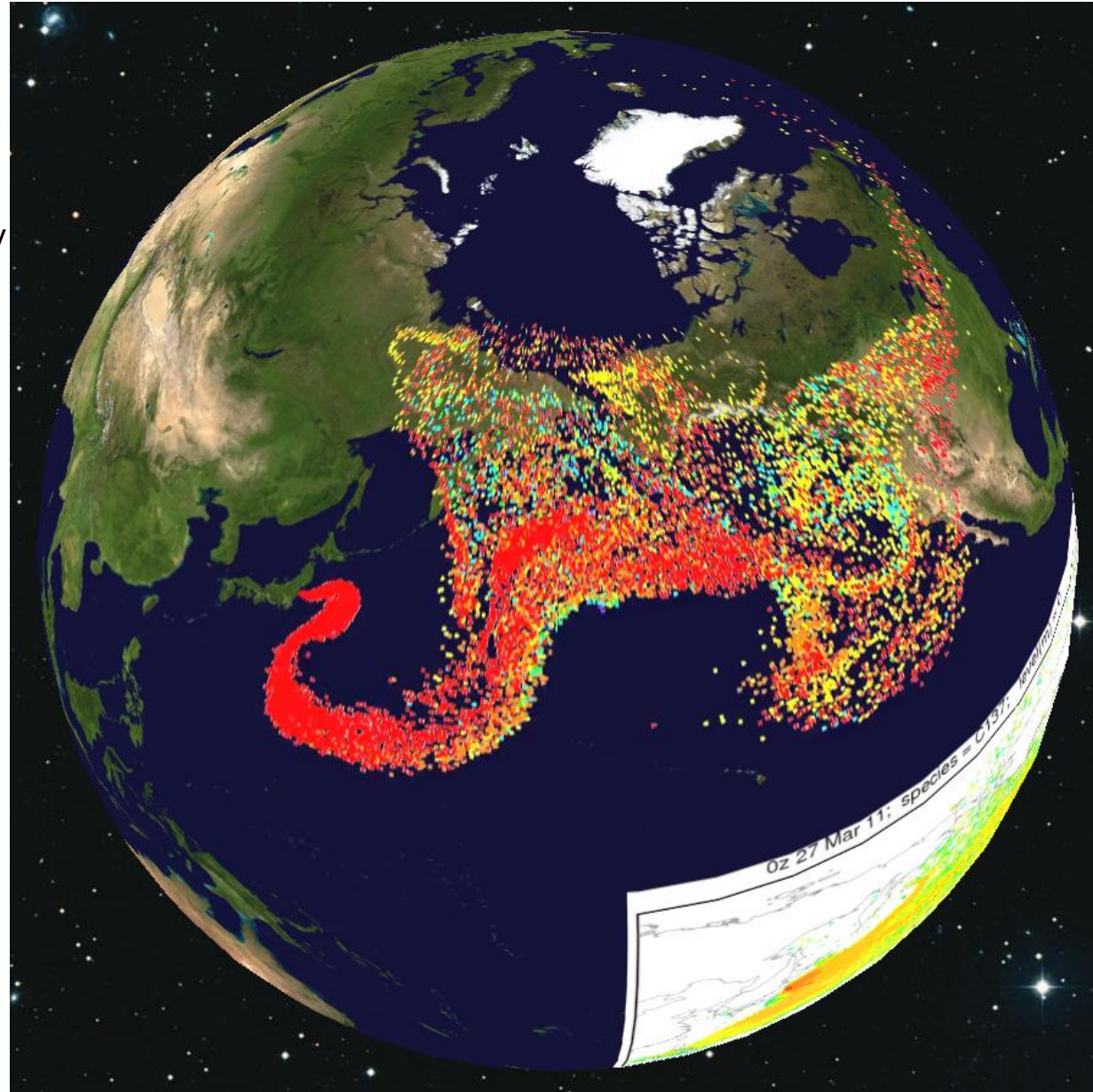
March 11, 2011

Cesium-137 emitted from Fukushima

Each change in particle color represents a decrease in radioactivity by a factor of 10.

Radioactivity decreases due to removal by rainfall and gravitational settling.

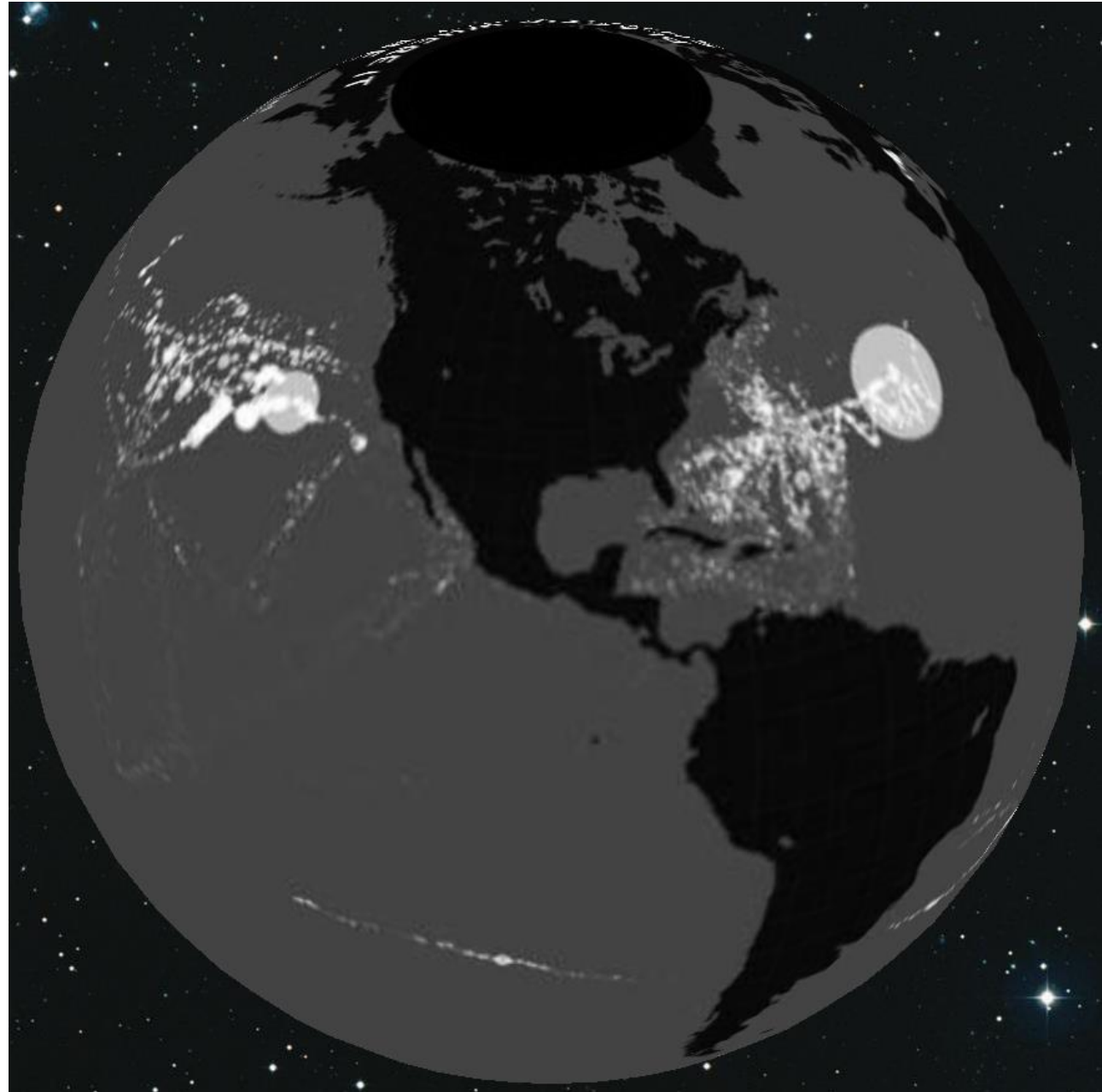
Decay is not a factor for Cesium in this short duration simulation compared to its 30 year long-half life.



Movie is available on the EsGlobe under "Fukushima radiation release"

“Plastic where it shouldn’t be”

Marine pollution collected
With 9490 surface nets
tows between 1986-2013.



Movie is available on the EsGlobe under
“Plastic Obs from Skye Moret (SEA)”