

[UPLOADER'S NOTE: YES, IT SAYS 'DYNAMIC PLANET', BUT IT'S REALLY A REMOTE SENSING TEST IN DISGUISE.]

There will be several projected images denoted by Roman numerals that can be used cross-referenced to some of the problems below.

- 1) What first civilian ocean research satellite was launched by NASA in June 1978?
 - a) Seasat
 - b) NORAD
 - c) Voyager
 - d) Ranger
 - e) Challenger

- 2) What substance in the ocean is the target of the Coastal Zone Color Scanner?
 - a) salinity
 - b) iron
 - c) chlorophyll
 - d) sediment
 - e) phosphate

- 3) What is the target of the microwave radiometers of the Aquarius Mission launched in 2011?
 - a) detection of salinity
 - b) detection of speeding vessels
 - c) detection of sea surface temperature
 - d) detection of fish distribution
 - e) detection of enemy submarines

- 4) What foreign nation's space program cooperates with NASA on the Aquarius mission?
 - a) India
 - b) Europe
 - c) China
 - d) Argentina
 - e) Pakistan

- 5) What band designation describes the operating wavelength on the Aquarius?
 - a) K-band
 - b) L-Band
 - c) S-band
 - d) V-band
 - e) W-Band

- 6) How high is sea level rise expected due to a complete melting of the Greenland icesheet?

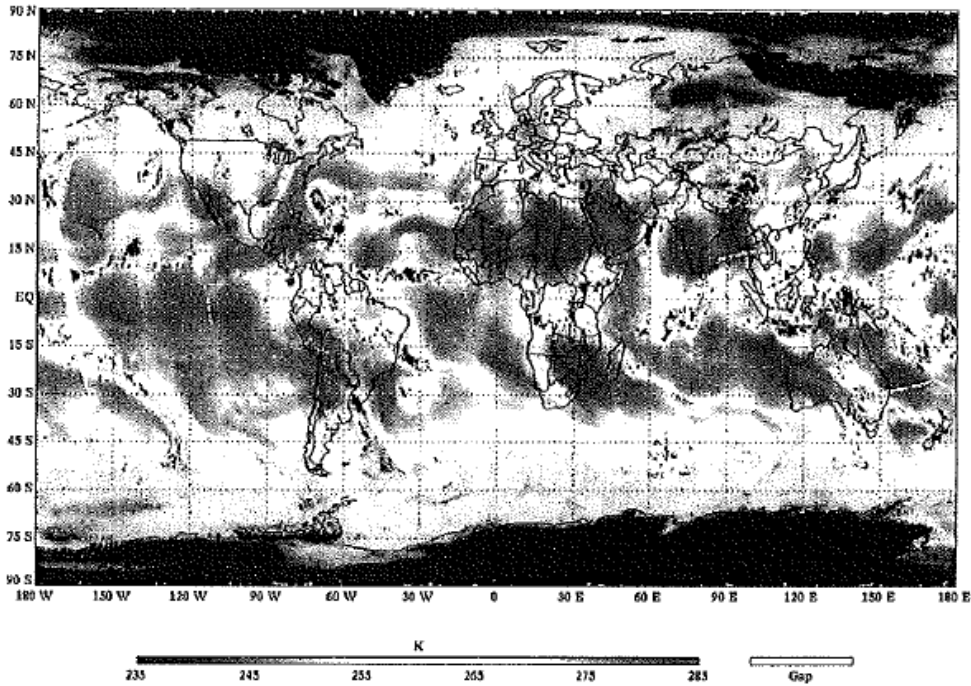
- 7) How high is sea level rise expected due to a complete melting of the Arctic sea ice expected by 2050?

- 8) How high is sea level rise expected due to a complete melting of the West Antarctic Ice icesheet?

- 9) How high is the ocean likely to rise due to thermal expansion by 2050 as predicted by most global climate models?

- 10) What does the second 'A' in NOAA stand for? _____

11) NOAA's coral reef watch system is primarily involved with the direct satellite monitoring of _____ to indicate coral bleaching hazard.



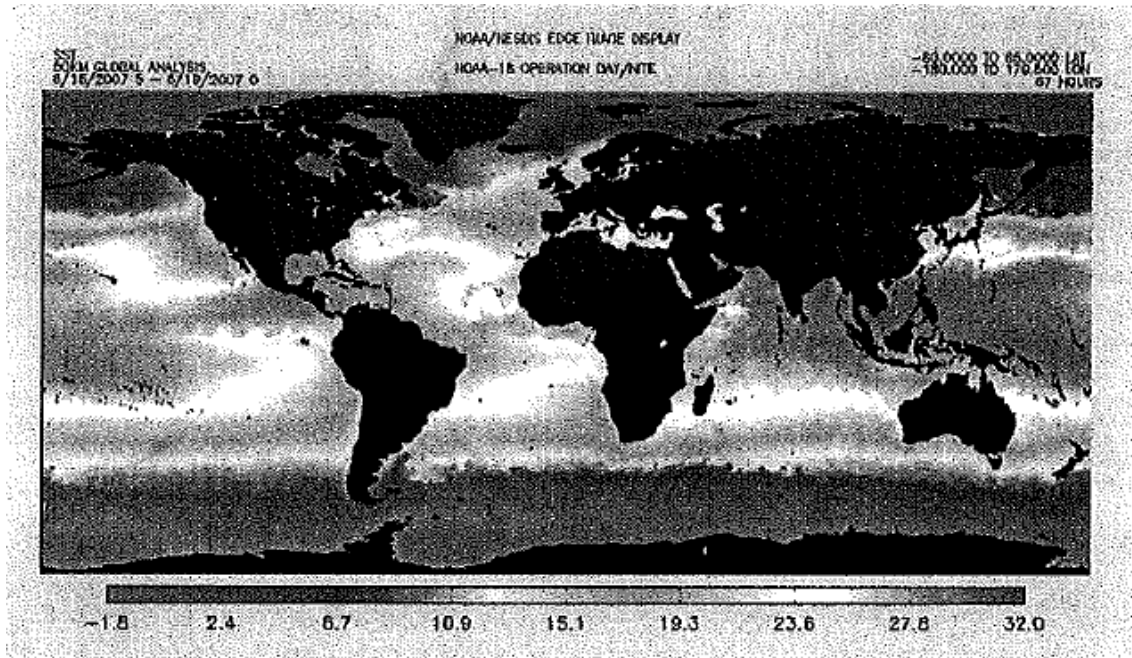
12)

I.

The recently launched NPP satellite has an advanced technology microwave sounder (ATMS) that made the above image or what atmospheric characteristic? _____

13) What is the blue zone near Cape Hatteras, NC likely to be? _____

14)



II.

In this ocean temperature map imaged by the visible infrared radiometer suite VIIRS on the NPP satellite we observed isotherms or seasurface temperature almost parallel to lines of latitude. Yet...

What ocean current is responsible for green isotherms to extend all the way down the west coast of North America?

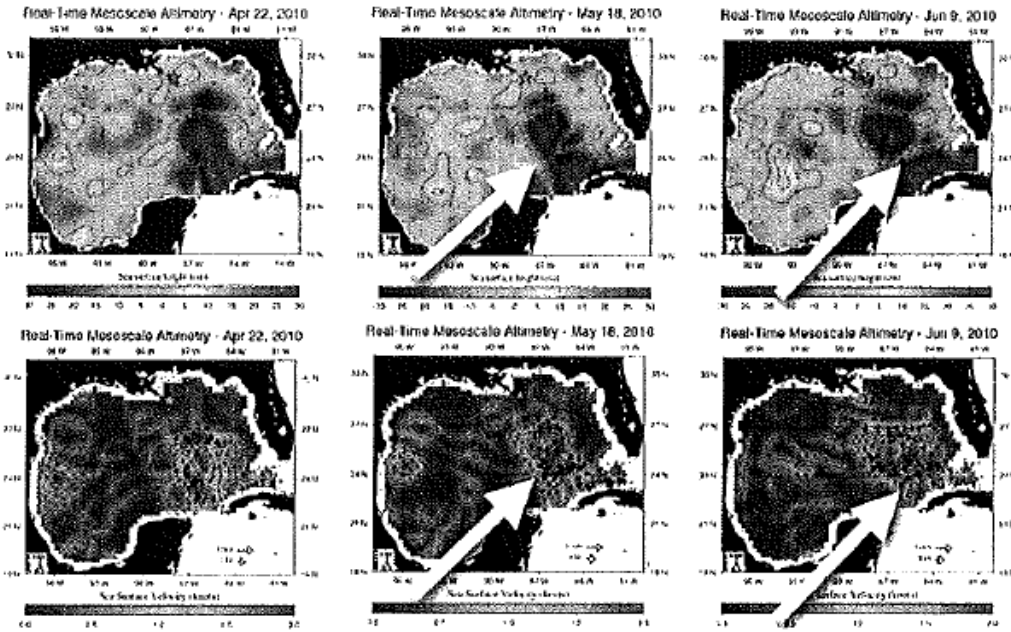
15) What ocean current extends the yellow isotherms up the east coast of North America as far as New Jersey?

16) JASON-1 orbits the Earth at an altitude of 1337 km conducting radar altimetry of the Earth's ocean surface. What does the relative elevation of sea surface mapping indicate for a single day's data?

17) (4pts.) How long does it take an emitted photon or radar to return to the JASON radiometers?

18) (4pts.) What time difference must be measured to discern a 10cm higher ocean surface?

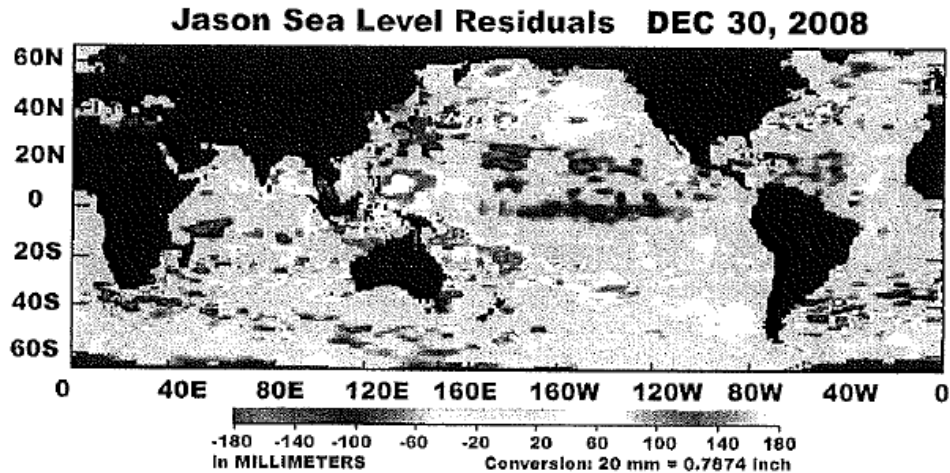
19)



III.

In this JASON image, what are the sequence of images showing about the Gulf Loop Current?

20) Why would the loop current show higher elevation than the Gulf of Mexico waters?



21)

IV.

22) If Nautical miles are equal to minutes of latitude (and near the equator longitude) how many nautical miles is the approximate area or the white patch of 180cm elevated seawater detected by JASON near the Philippines

23) (4pts) If this seawater is 5 Celsius degrees warmer than the adjacent water and its surface is elevated by 180 cm, in order to float this high, how far down into the ocean does this mass of warm water extend below the surface?

24) If this mass of water shifts eastward it may be forced along the equator in a Kelvin wave. Why wouldn't the water leave the equator until it reaches South America?



25)

V.

What event of hydrology is indicated by this infrared satellite image of this ski lodge in Killington, Vermont?

26) What do areas by the ski-lodge lacking in red coloration indicate?

Key:

- 1) A
- 2) C
- 3) A
- 4) D
- 5) B
- 6) 7m +/- 1m
- 7) 0m
- 8) 5-6m +/- 1m
- 9) 40-60cm
- 10) Administration
- 11) Temperature (at the sea surface)
- 12) moisture (at low altitude) or water vapor
- 13) a tropical storm/hurricane/cyclone
- 14) California Current/Alaska Current
- 15) the Gulf Stream
- 16) a gradient of pressure, tendency to form currents
- 17) 4.457×10^{-3} s (4pts)
- 18) 7×10^{-10} s (4pts)
- 19) it can break of into a (clockwise or anti-cylonic *extra-pt*) ring
- 20) it is warmer therefore less dense and floating
- 21) misnumbered (oops)
- 22) $15-20 \text{ deg} \times 10 \text{ deg} \times (60\text{minutes/deg})^2 = 540,000 \text{ nm}^2 \rightarrow 720,000 \text{ nm}^2$ (4pts)
- 23) accept answers in the range of 1000-2000 m (4pts)
- 24) Coriolis Effect
- 25) Mud flow, Sediment Deposition, Flooding
- 26) loss of vegetation due to flooding