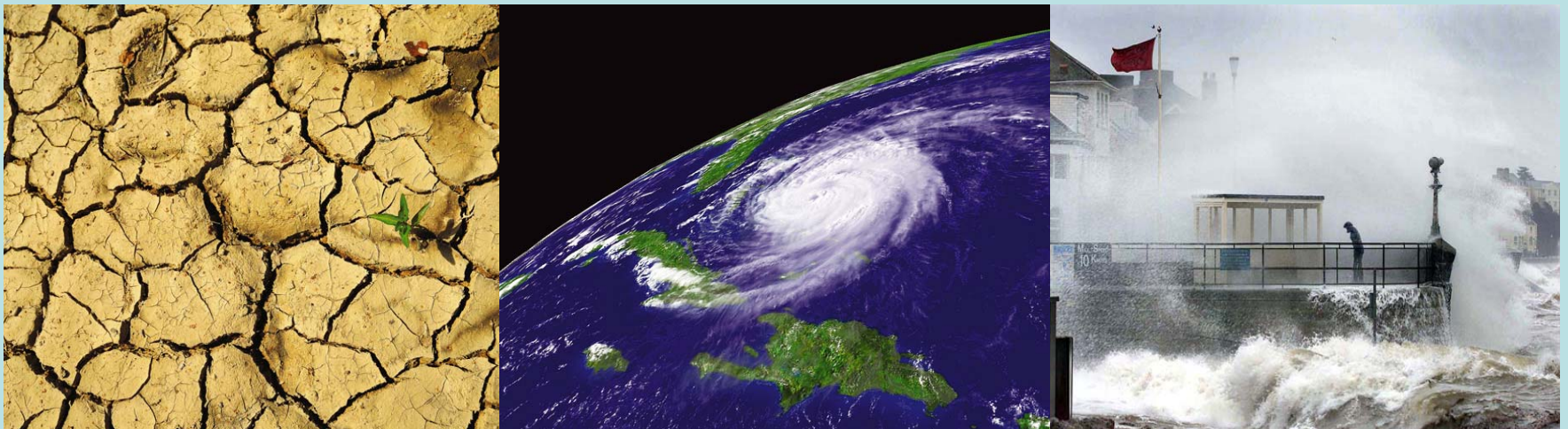
A satellite image of Earth showing cloud patterns over the globe. The image is centered on the equator, showing the Americas on the left and the Pacific and Indian Oceans on the right. The clouds are depicted in white and light blue, swirling in various patterns across the globe. The background is black, making the Earth stand out.

**Satellite
Meteorology
Protecting Life and
Property Around
the World**

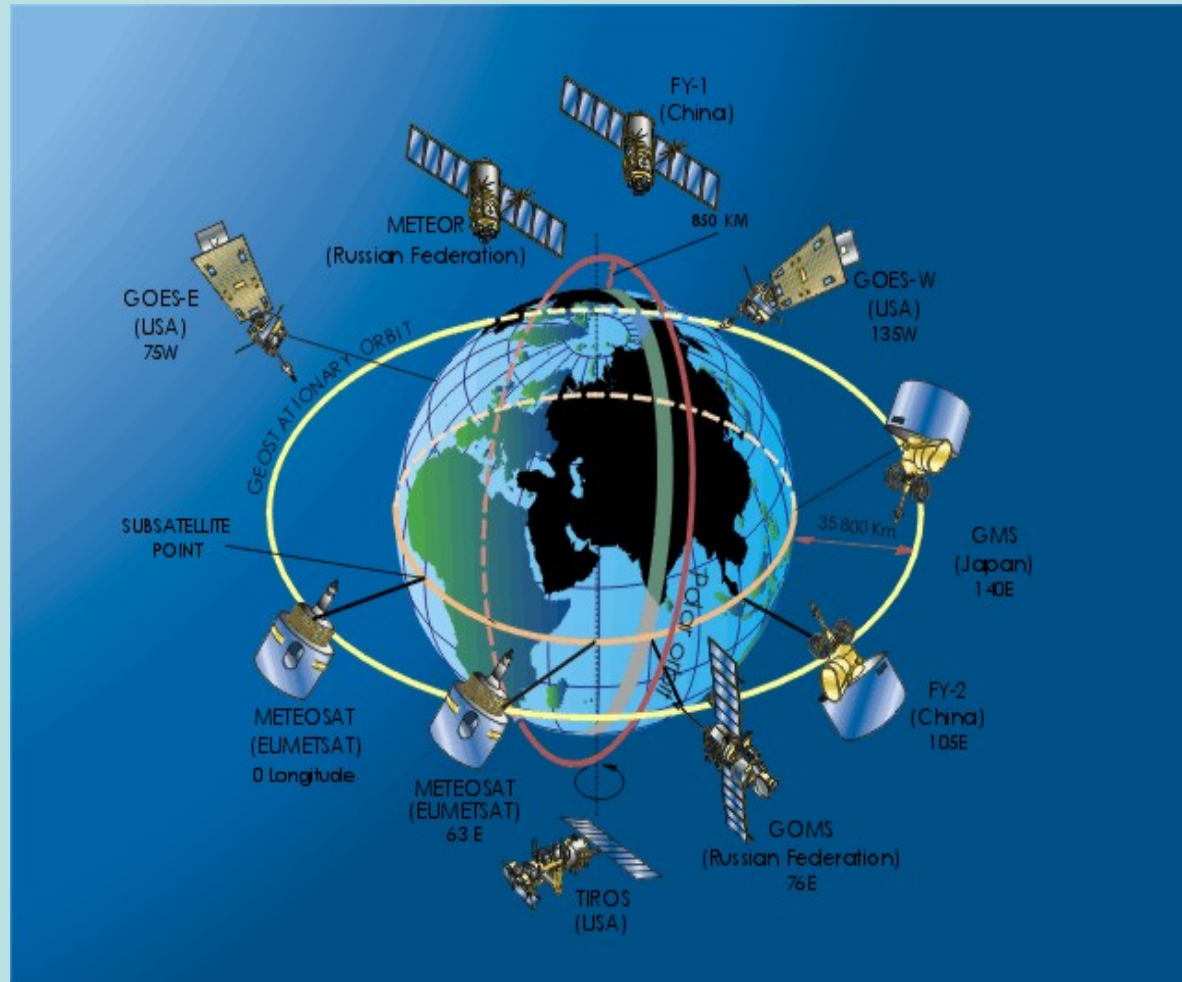
The Value of Forecasting Severe Weather

- Flooding events across Europe in August 2002 cost in the region of €20 billion;
- 20,000 people died as a result of the summer heat wave in Europe in 2003;
- In summer 2004 annual monsoons left 5 million homeless and more than 1,800 dead in India, Nepal, and Bangladesh;
- An unusual number a major hurricanes struck the US between August and September in 2004 and 2005 killing a large number of people and causing \$bns of damage.

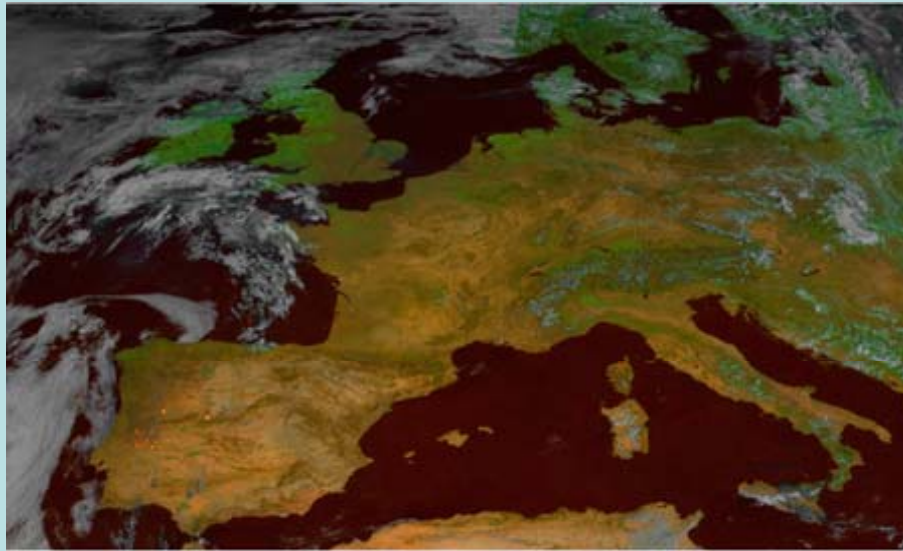


Using Satellites to Observe the Earth

- Satellite observations are vital if we are to mitigate such disasters in future;
- Unique vantage point, continuous global coverage;
- EUMETSAT alone spends more than €300m on satellite programmes every year – international collaboration is therefore essential.

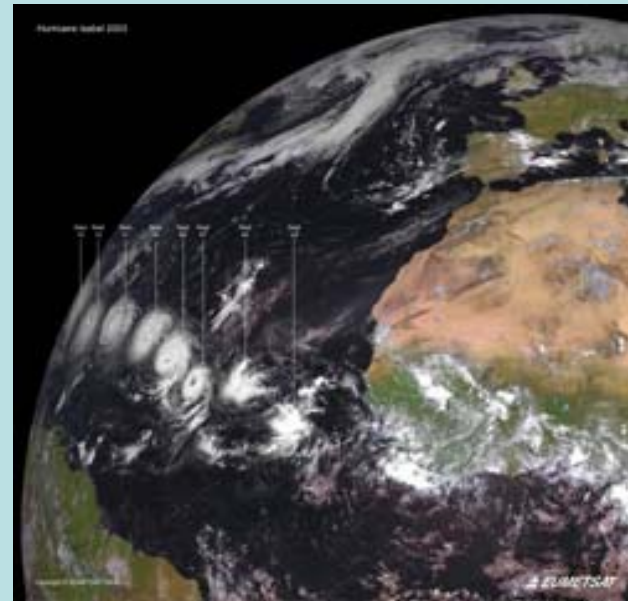


Applications of Satellite Meteorology

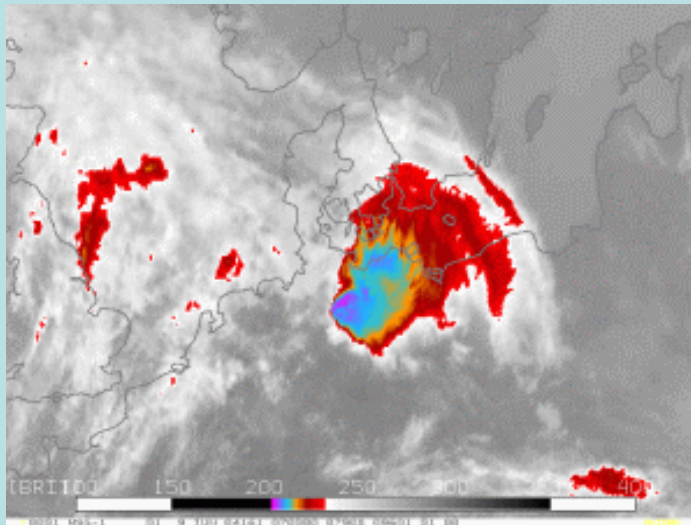


Meteosat - 8 04/08/2003 10:45 Fires in Portugal & Spain © EUMETSAT 2003

Heat Wave and Forest Fires

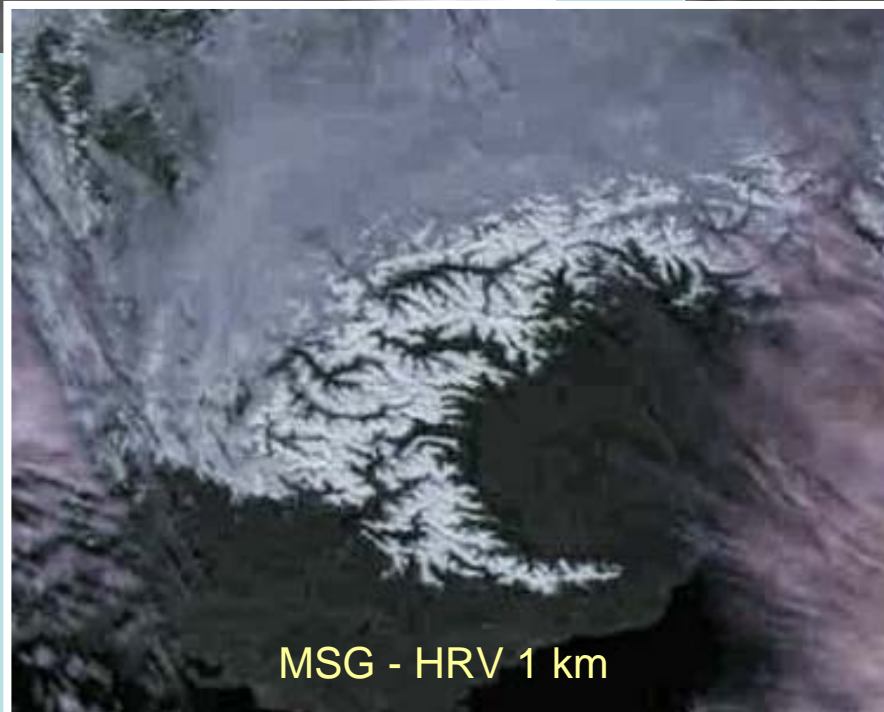
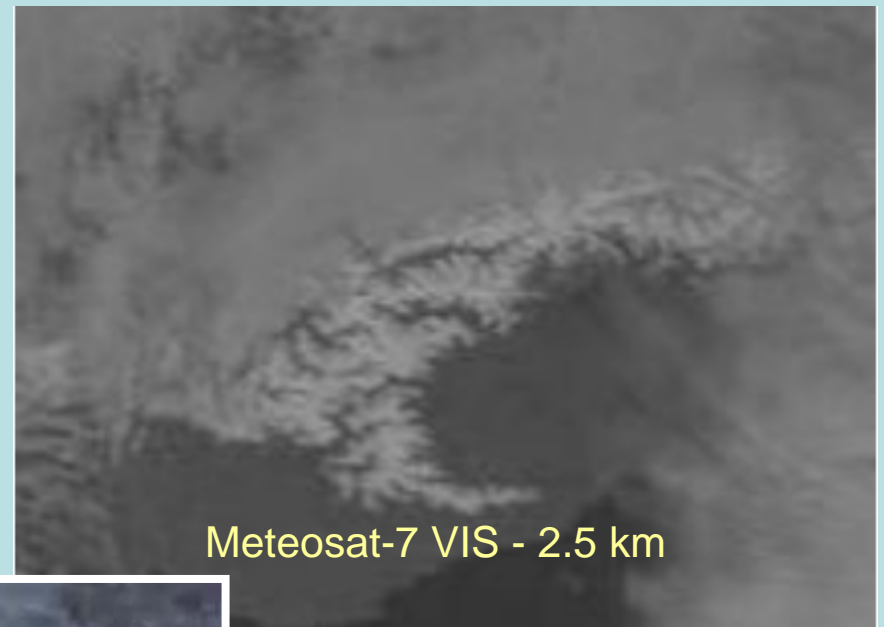
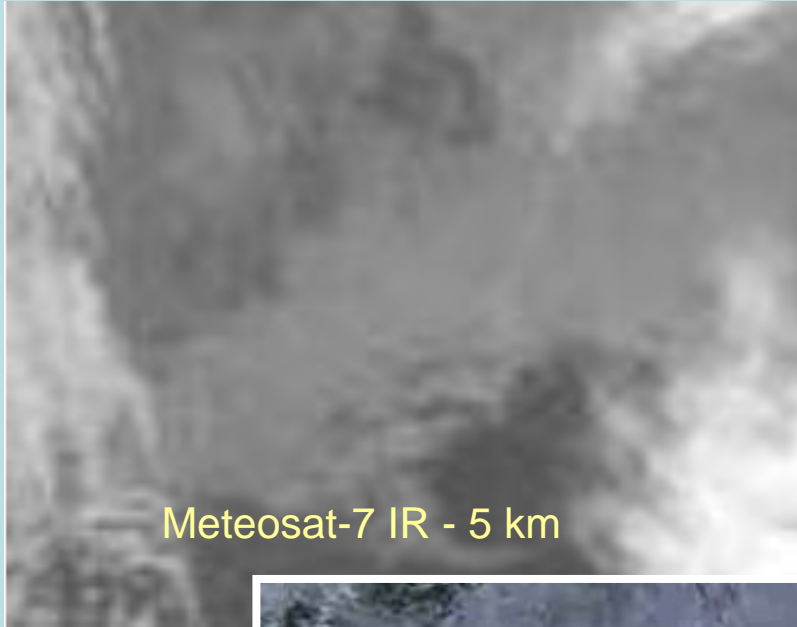


Hurricane Track
Forecasting



Severe Storms in Europe

Applications of Satellite Meteorology - a better view



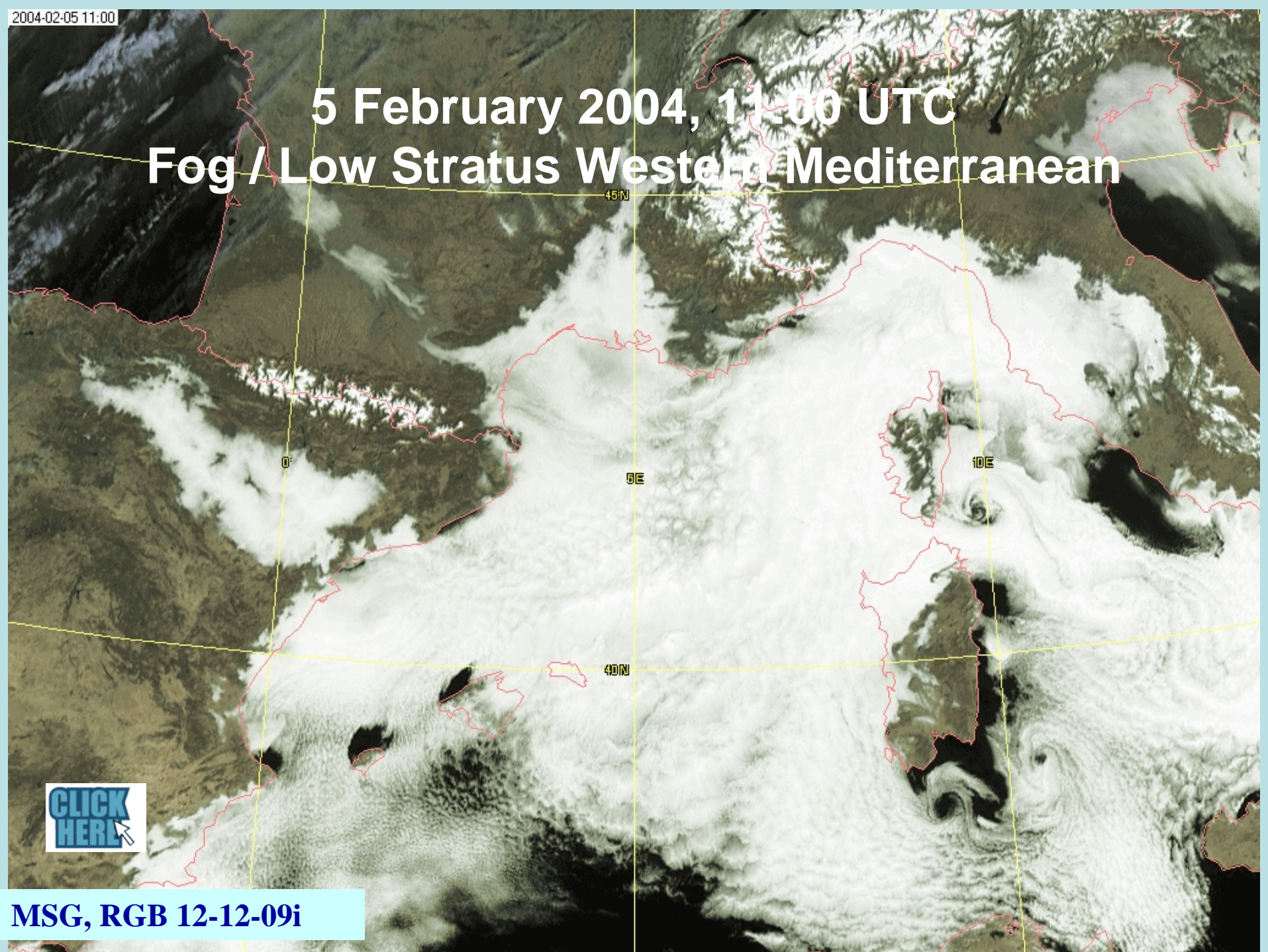
HRV over Europe.

FOG



2004-02-05 11:00

5 February 2004, 11:00 UTC Fog / Low Stratus Western Mediterranean

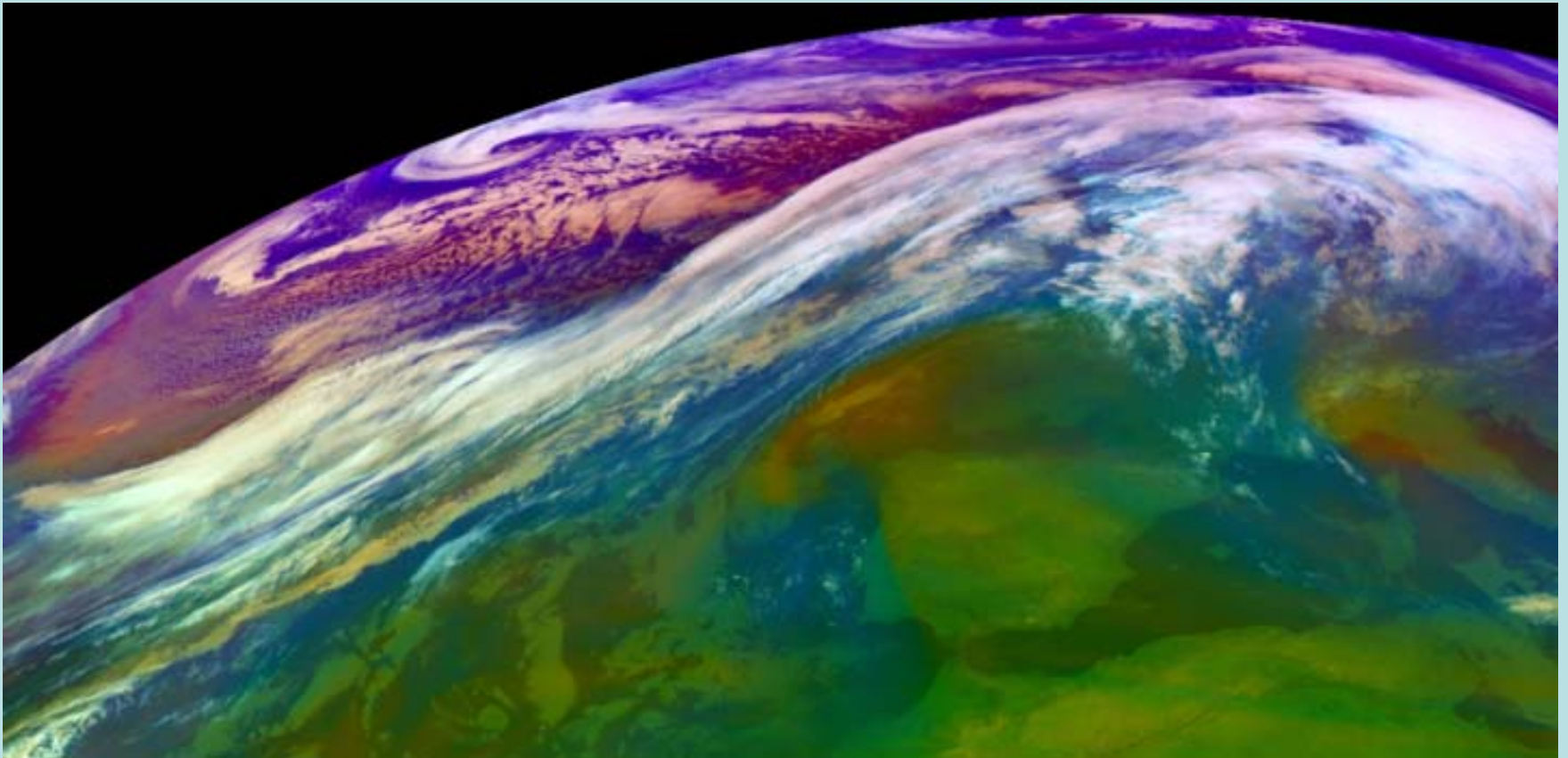


[CLICK
HERE](#)

MSG, RGB 12-12-09i

Detecting Storm Development

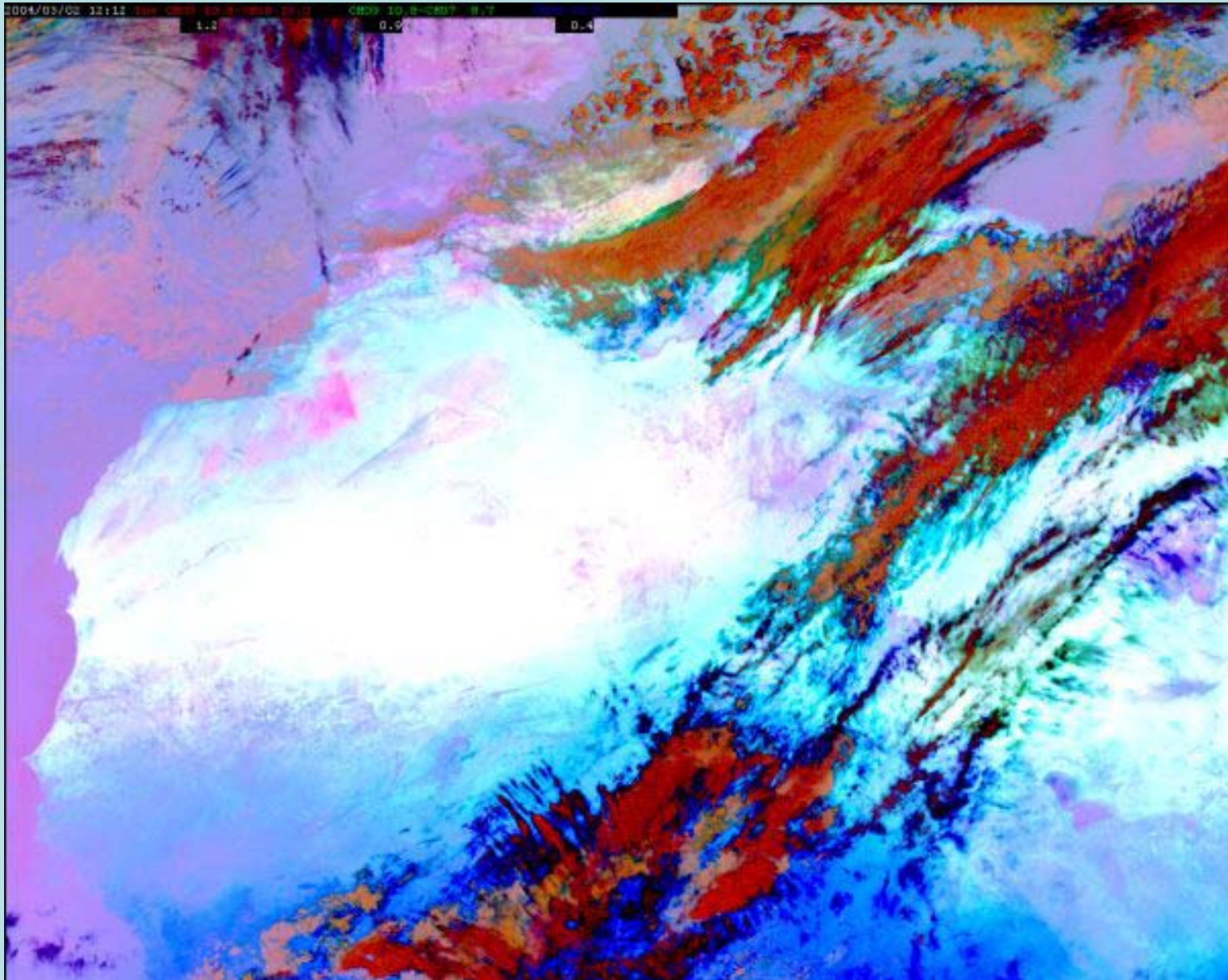
Colour composite of two WV channels, the ozone channel and the window channel enables early detection of storm development. This is a Storm that developed over the Atlantic early January 2005



DUST STORMS



Dust Storm Detection

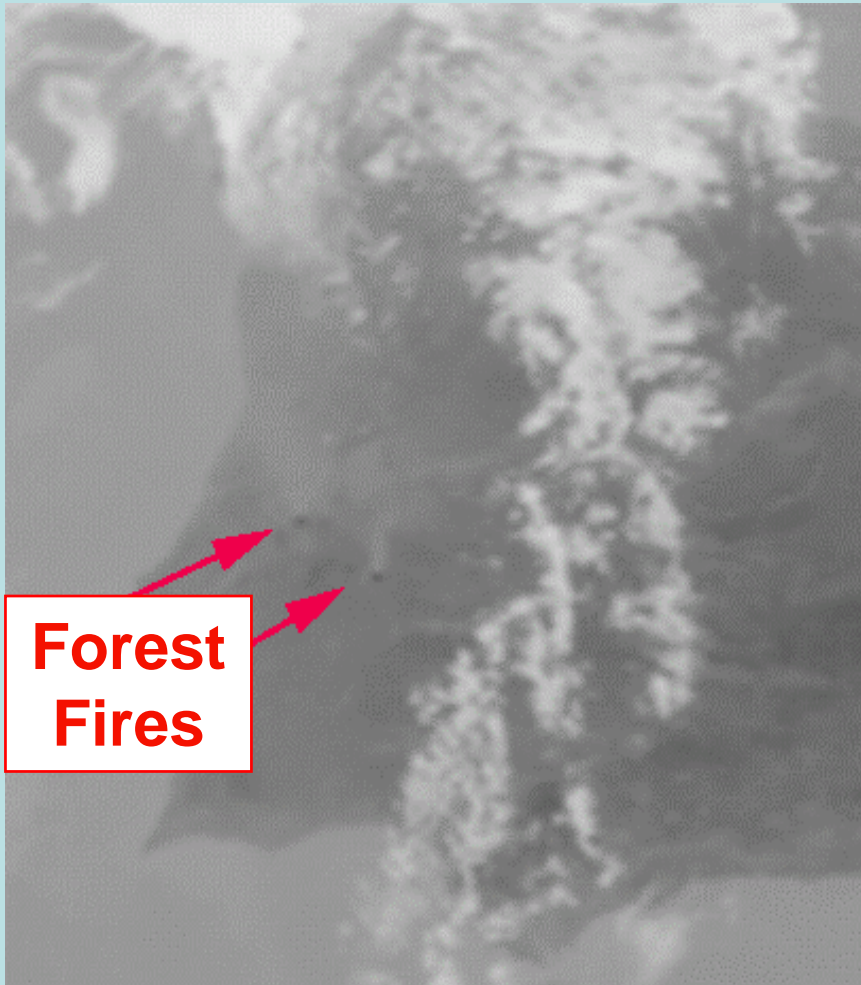




FIRES

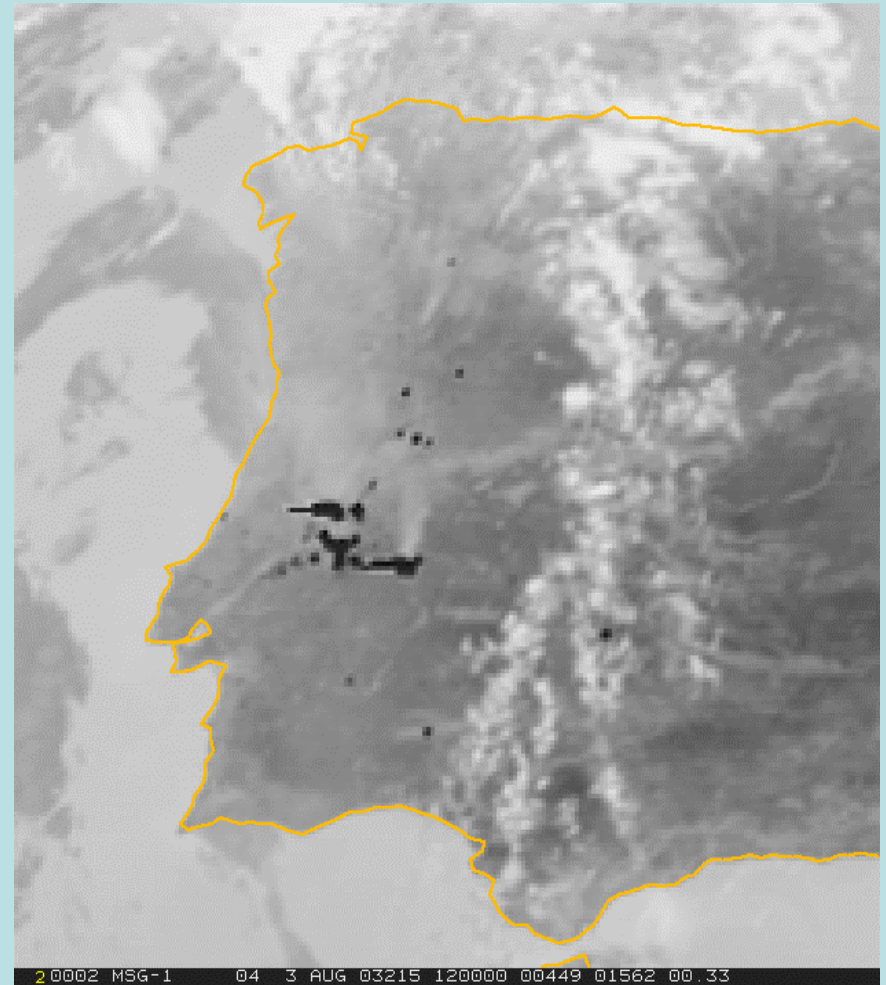
3 August 2003, 12:00 UTC

Forest Fires Portugal & Spain



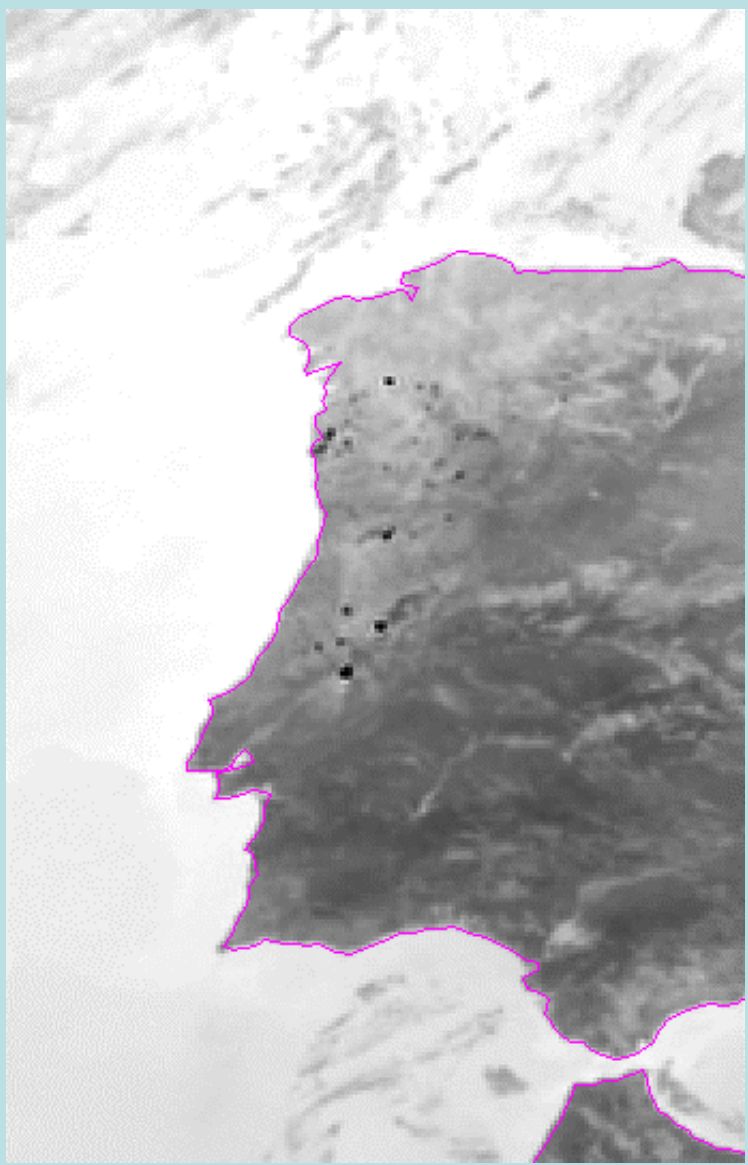
**Forest
Fires**

MFG IR Channel i

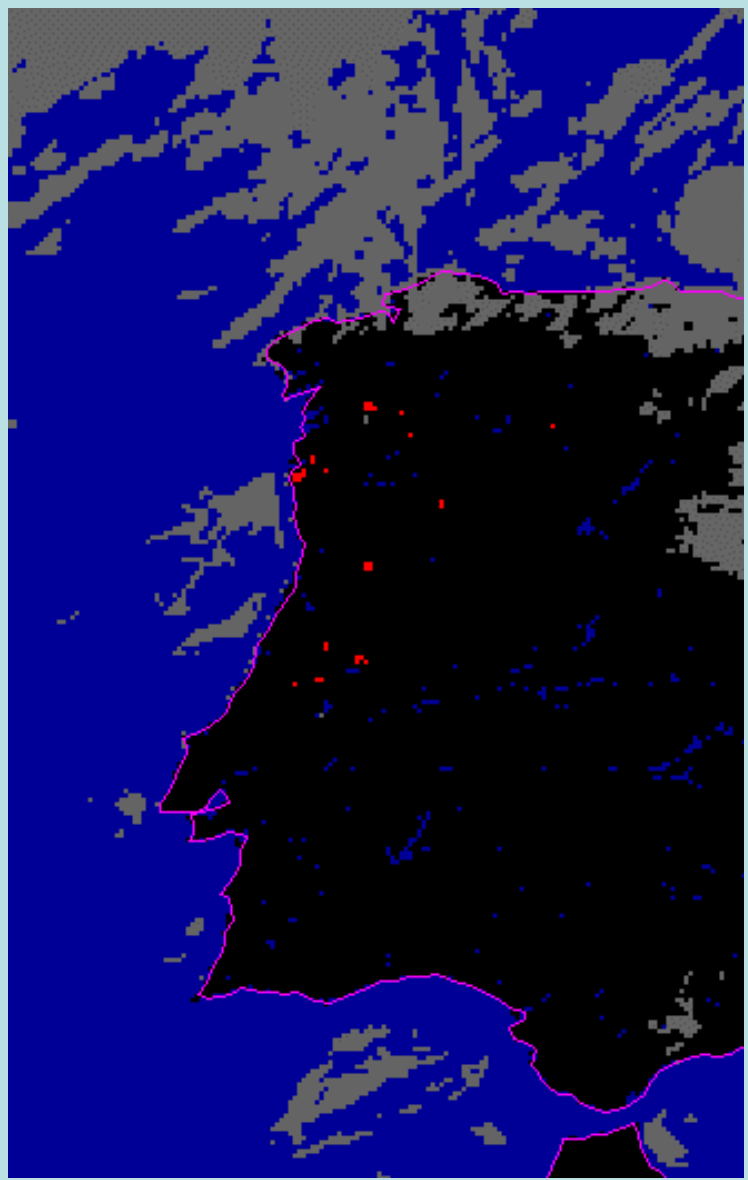


MSG Channel IR3.9i

Wild Fires: Example from Portugal / August 2005



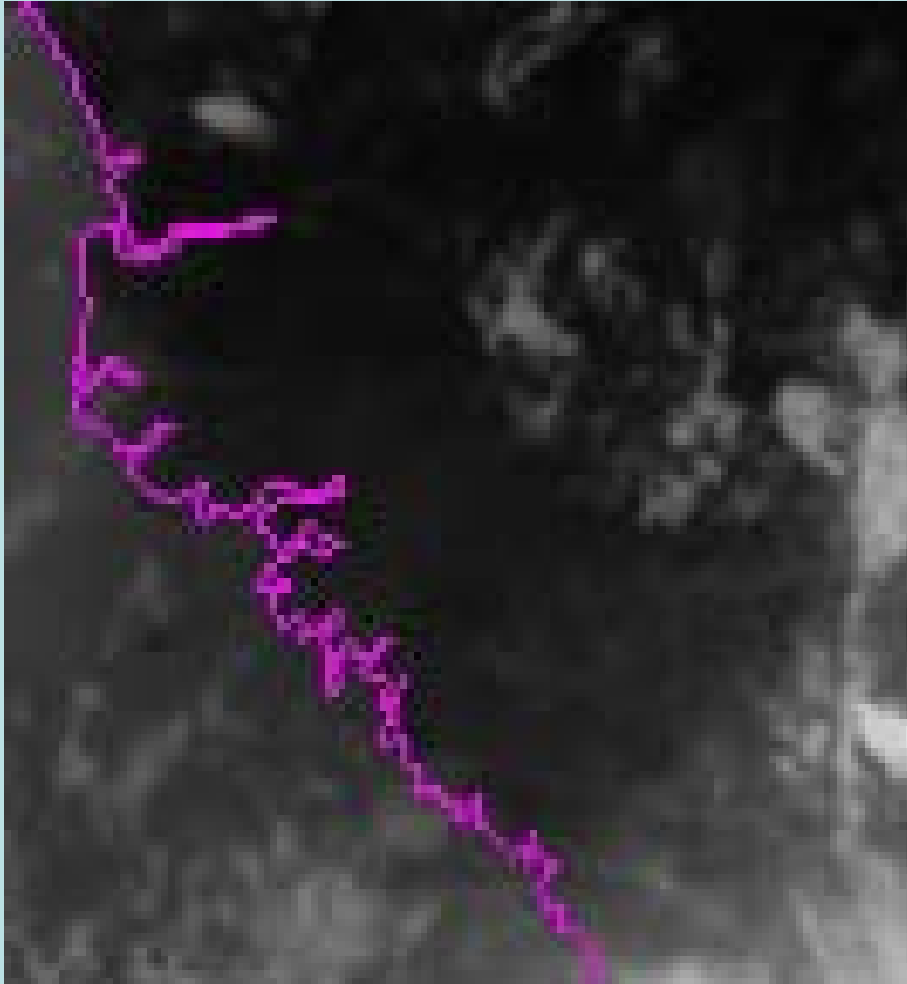
IR3.9 image



Result of objective fire detection

27 April 2004, 14:15 UTC

Fires over Guinea



MFG IR Channel i

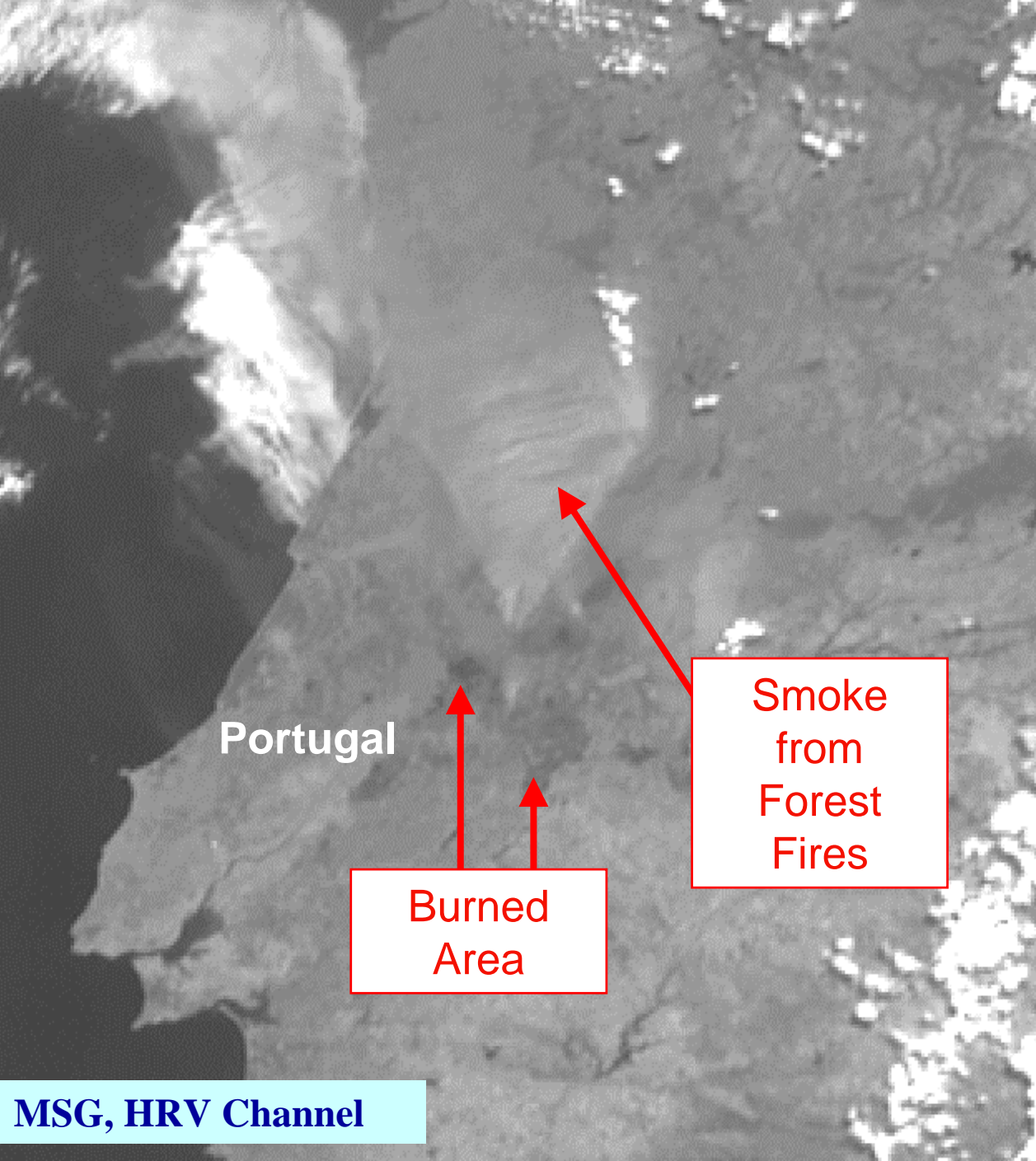


MSG RGB Composite
IR3.9r, NIR1.6, VIS0.6

An aerial photograph of a tropical coastline. The foreground shows a clear, turquoise lagoon with several small boats. A narrow sandy beach separates the lagoon from a dense, green forest. In the background, a large, dark, and billowing plume of ash or smoke rises into the sky, partially obscuring the blue sky. The plume has a dark, charcoal-like base that transitions to a lighter, ashy grey at the top. The word "SMOKE" is overlaid in the center of the image in a bold, yellow, sans-serif font.

SMOKE

3 Aug 2003 Forest Fires Portugal & Spain



Portugal

Burned
Area

Smoke
from
Forest
Fires



MSG, HRV Channel

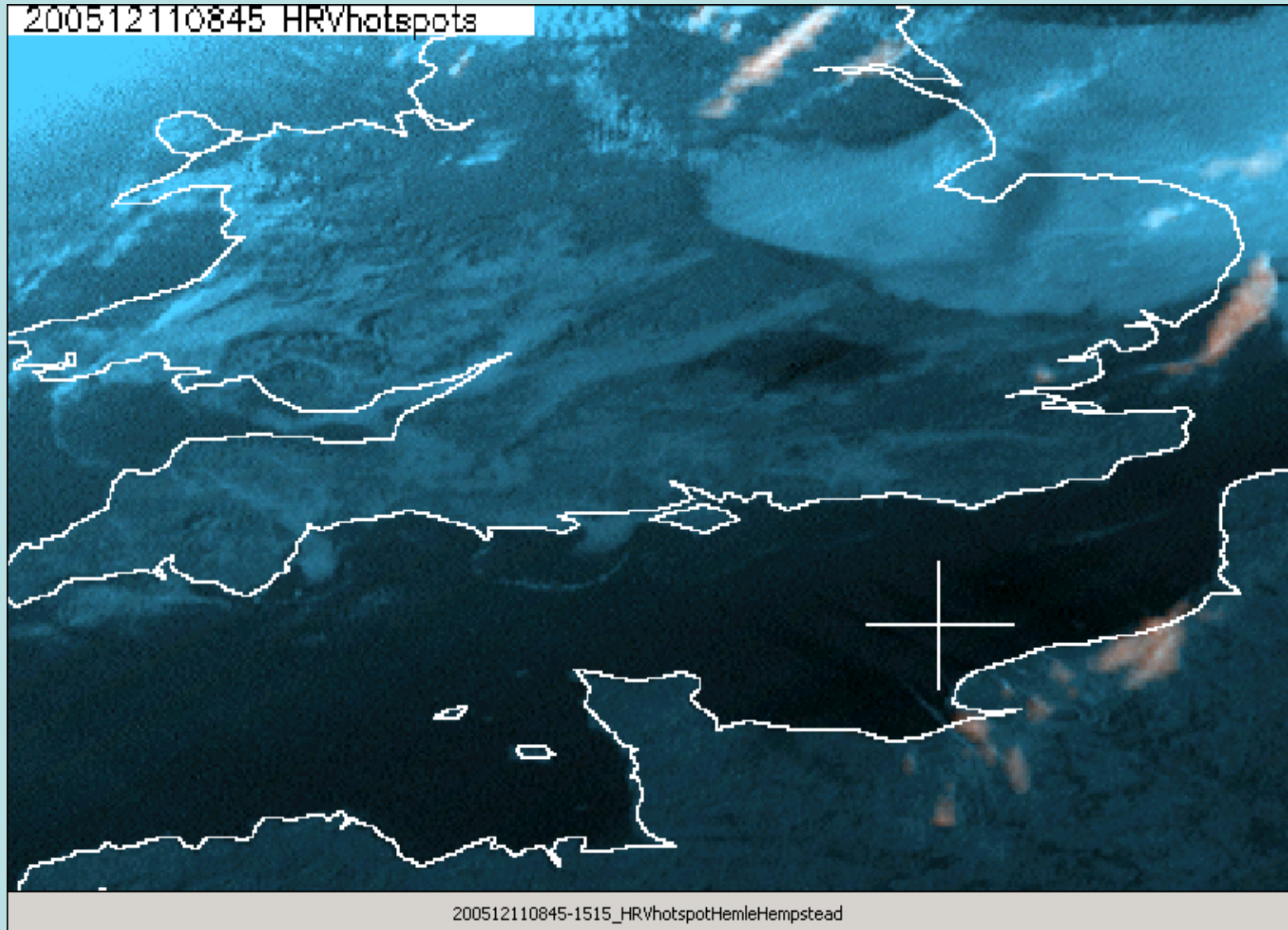
2003-06-25 08:12 T-Difference 9-7

25 June 2003, 12:00 UTC Fire Sulphur Plant Iraq

MSG, Difference IR10.8 - IR8.7



Smoke Tracking from Buncefield Oil Refinery, UK (note hot spot detection)

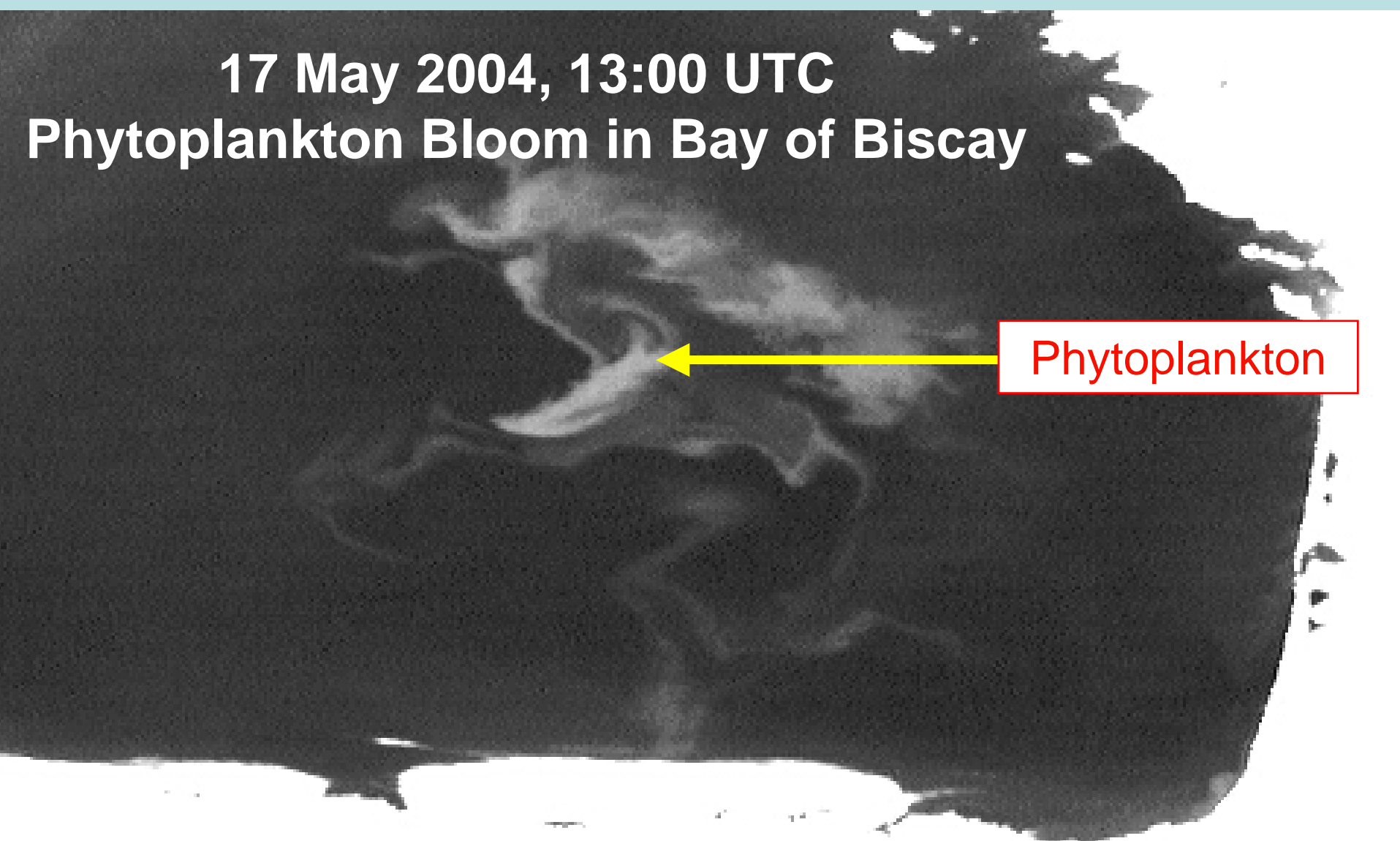


An aerial photograph of a coastal region, likely the Gulf of Mexico. The image shows a large body of water with varying shades of blue and green, indicating different water depths and possibly phytoplankton concentrations. The coastline is visible on the right side, with a mix of green land and white sandy areas. The text is overlaid on the lower portion of the image.

Enhancing the Fishery Business

By Plankton Monitoring

17 May 2004, 13:00 UTC Phytoplankton Bloom in Bay of Biscay



Phytoplankton

MSG, Channel 12 (HRV)

[CLICK HERE](#)

**cold coastal water
(Benguela current)**

MSG, RGB VIS0.8, IR10.8, IR12.0

Thunderstorms

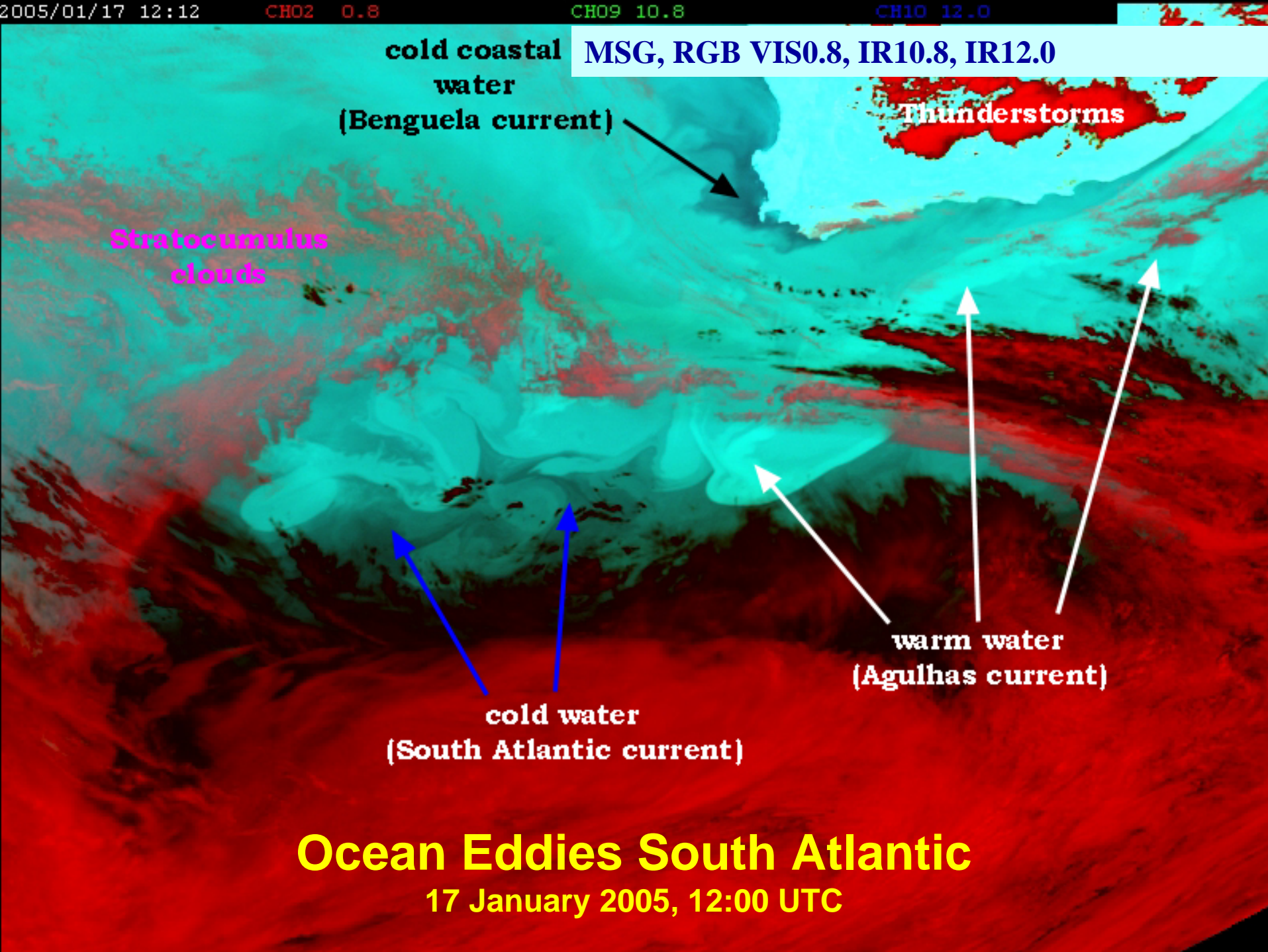
Stratocumulus clouds

**cold water
(South Atlantic current)**

**warm water
(Agulhas current)**

Ocean Eddies South Atlantic

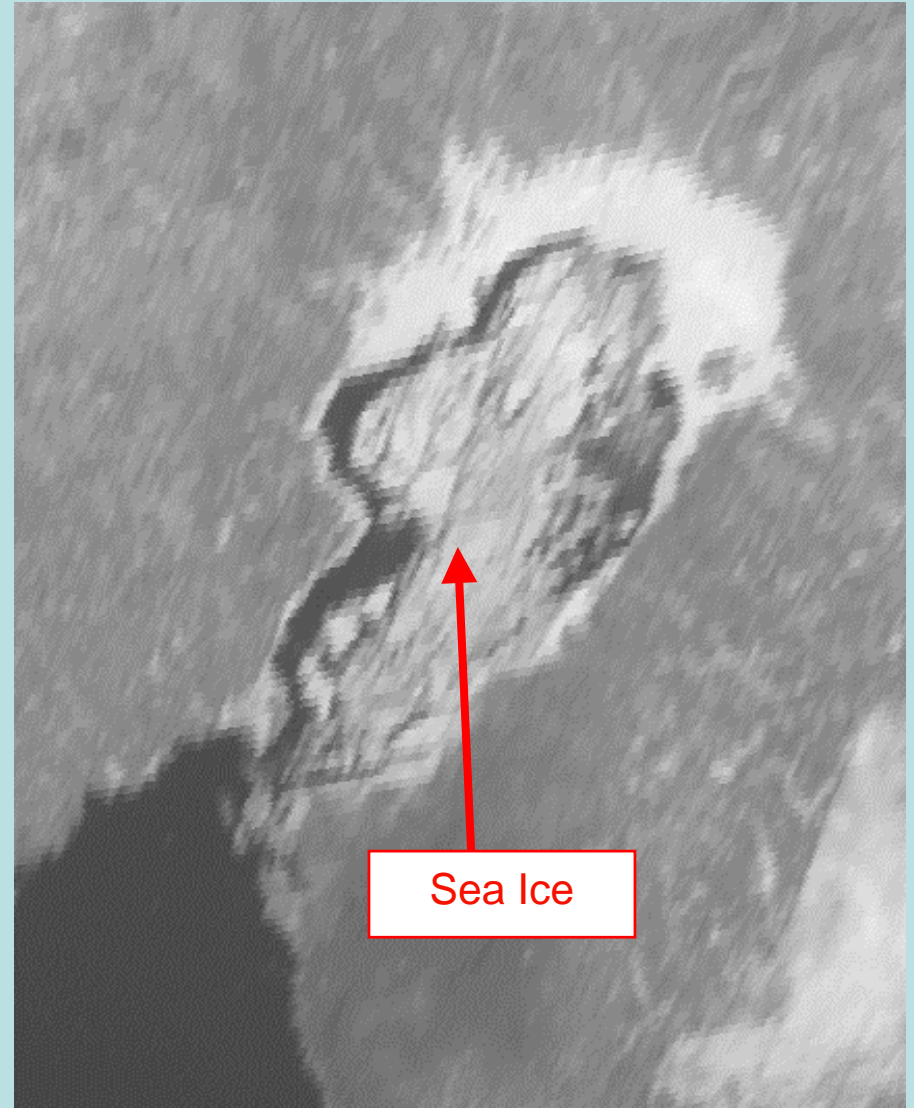
17 January 2005, 12:00 UTC



2 April 2004, 11:00 UTC
Sea Ice Gulf of Bothnia



MFG VIS Channel

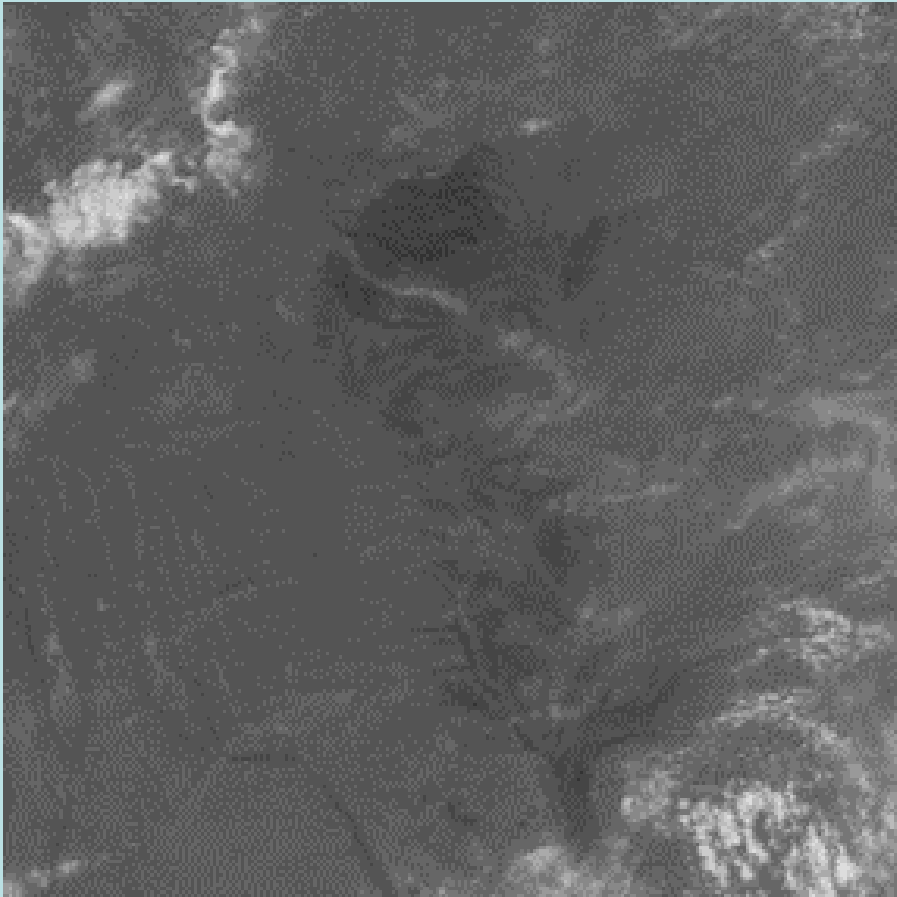


MSG Channel 12 (HRV)

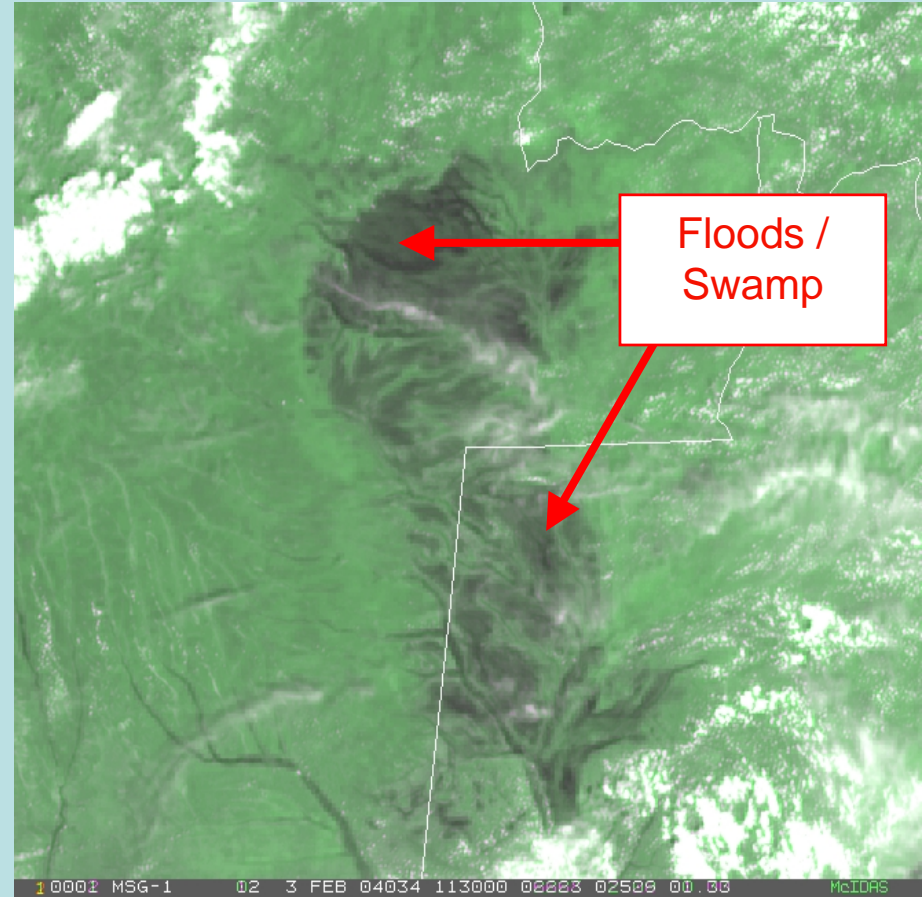
FLOODS



3 February 2004, 11:30 UTC Floods Angola-Zambia



MFG VIS Channel

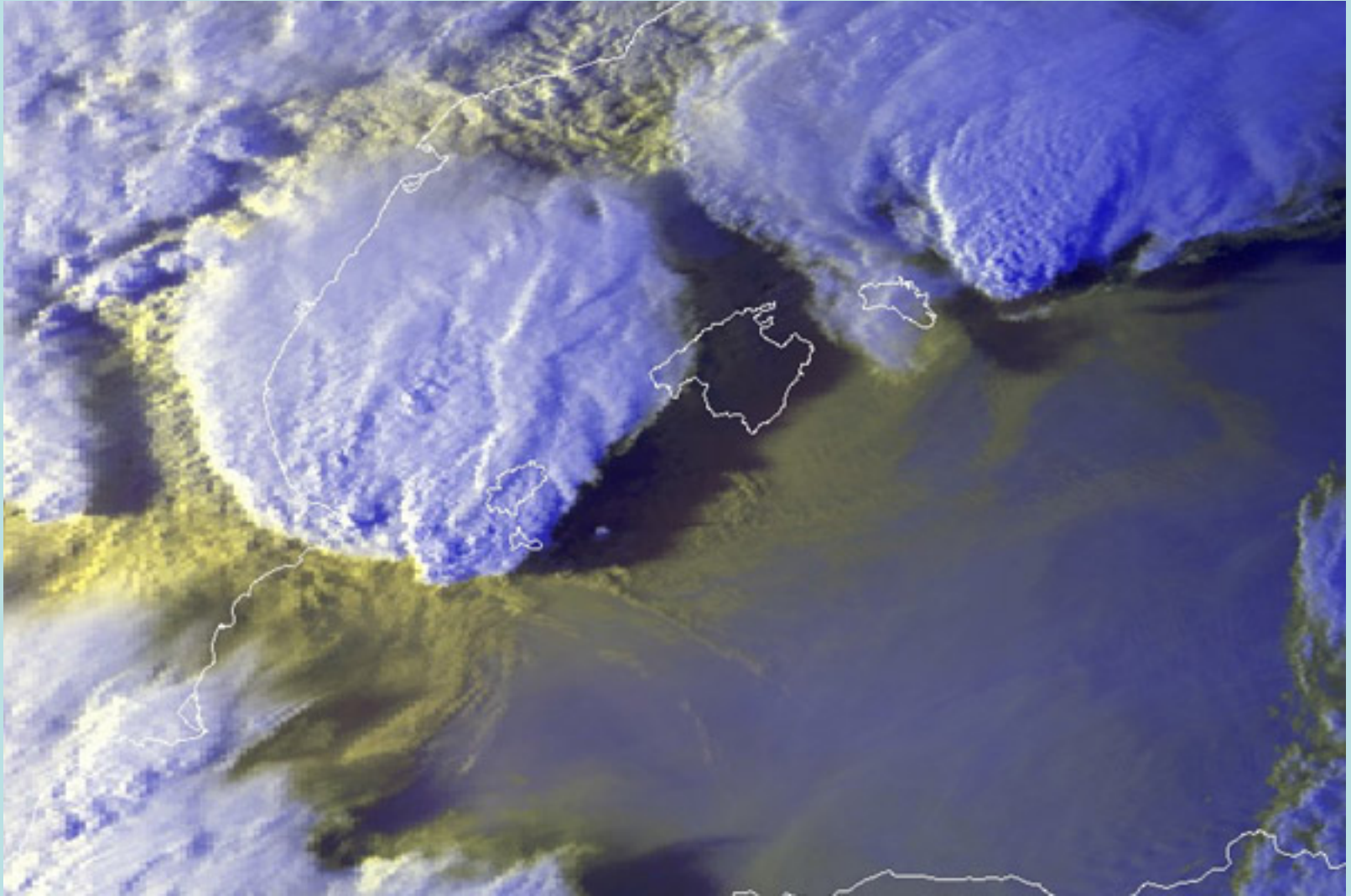


MSG RGB 12,02,12

Severe Storms

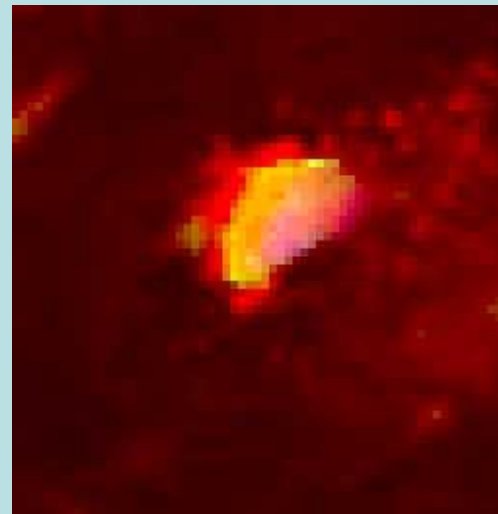


Satellite view of a tornadic supercell

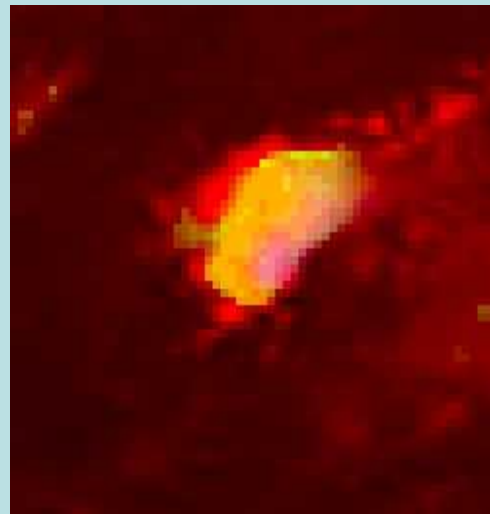


11 September 1996 1724 UTC NOAA 12, Spain, Balearic Islands (Ibiza)

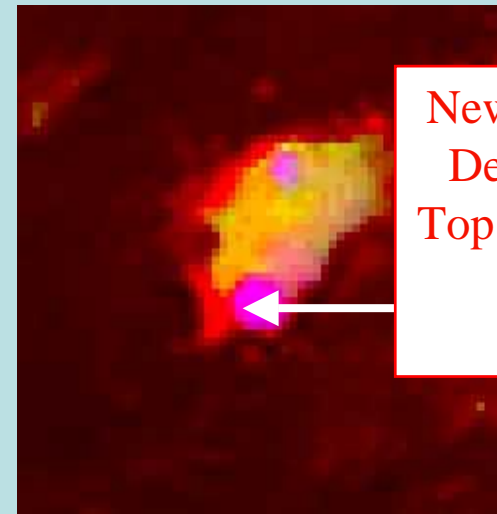
Thunderstorm Growth - Northern Cameroon (avoiding severe aviation hazards)



12:30 UTC

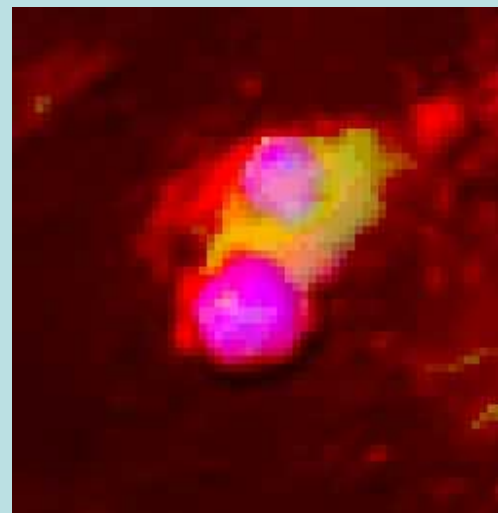


12:45 UTC

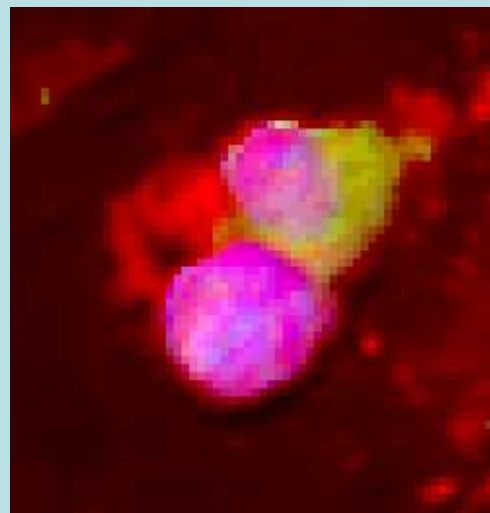


New Convective
Developments
Top Temp. -78°C
Small Ice
Particles

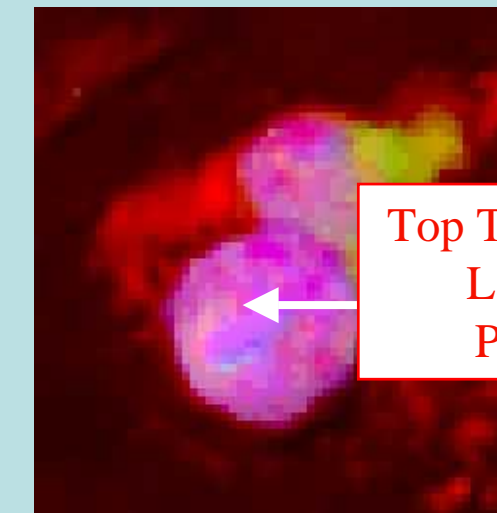
13:00 UTC



13:15 UTC



13:30 UTC



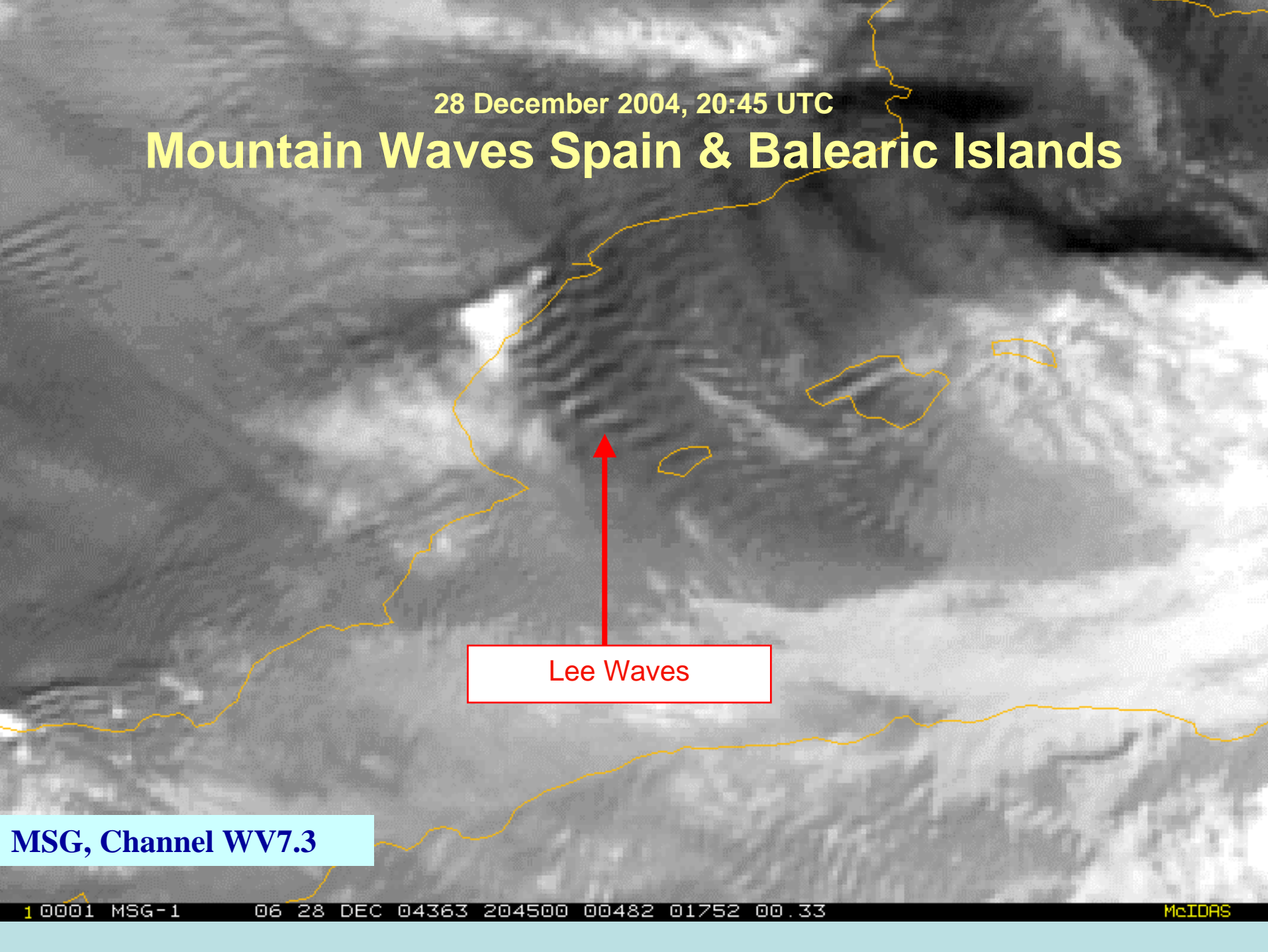
Top Temp. -83°C
Large Ice
Particles

13:45 UTC

MSG, RGB VIS0.6, IR3.9i, IR10.8i

28 December 2004, 20:45 UTC

Mountain Waves Spain & Balearic Islands



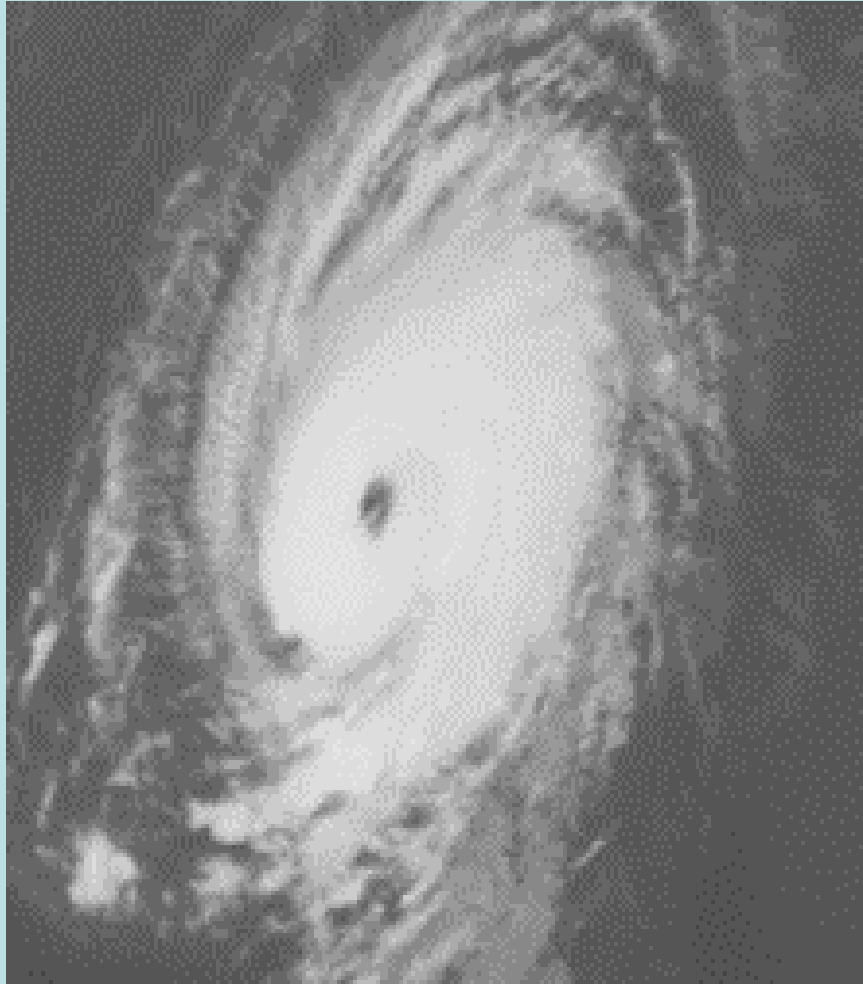
Lee Waves

MSG, Channel WV7.3

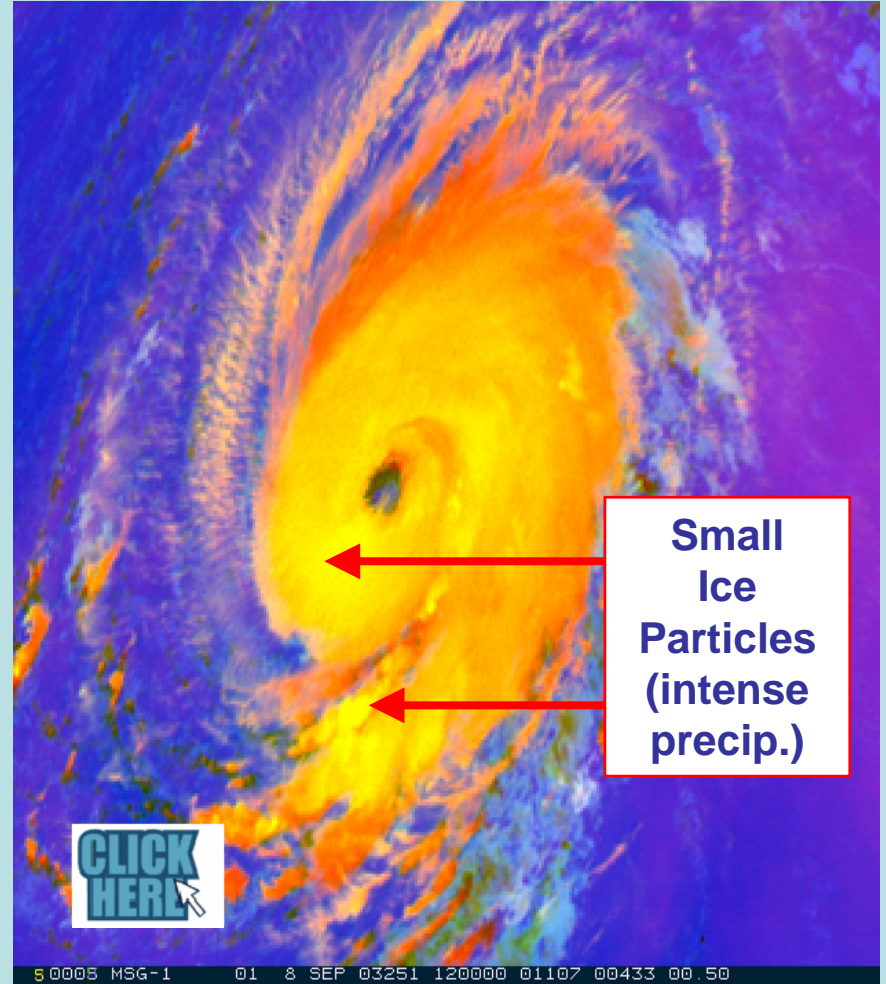
A photograph showing several palm trees being blown over by a hurricane. The trees are leaning significantly to the right, and the background is a hazy, overcast sky. The word "HURRICANES" is overlaid in the center in a bold, yellow, sans-serif font with a black outline.

HURRICANES

8 September 2003, 12:00 UTC Hurricane "Isabel"



MFG IR Channel i



Small
Ice
Particles
(intense
precip.)

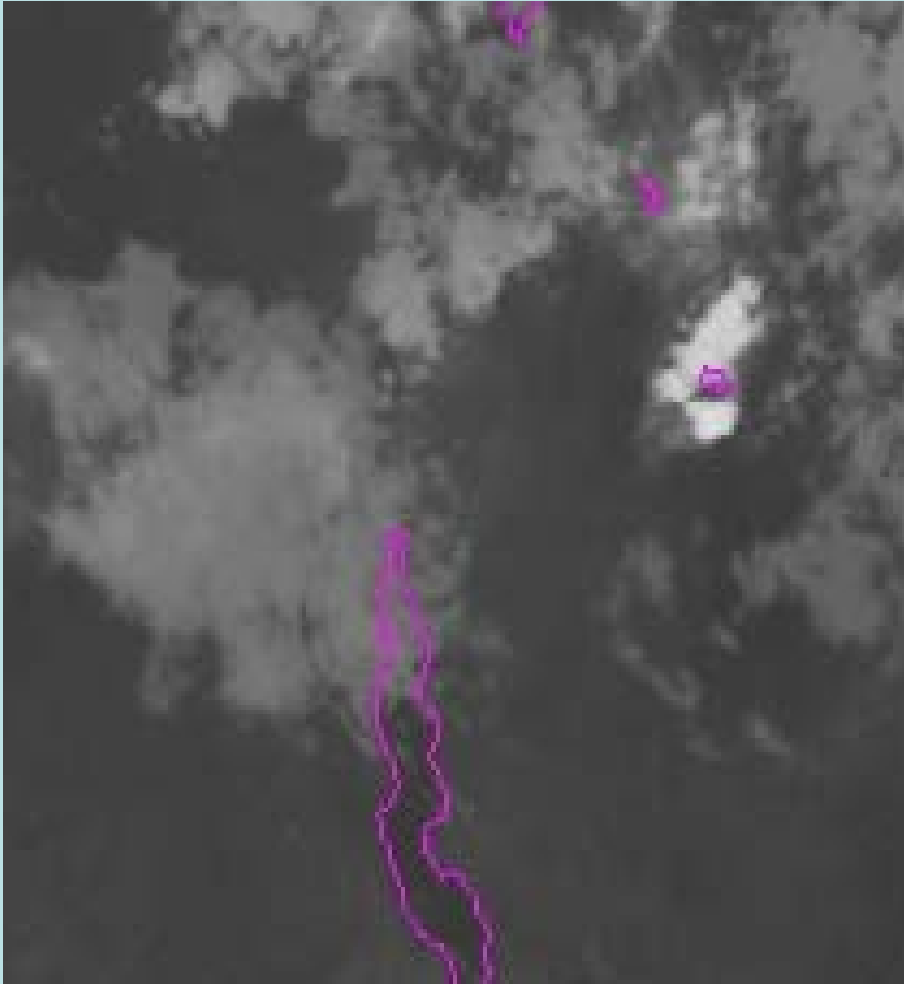
MSG RGB 05-06,04-09,03-01

VOLCANIC ASH

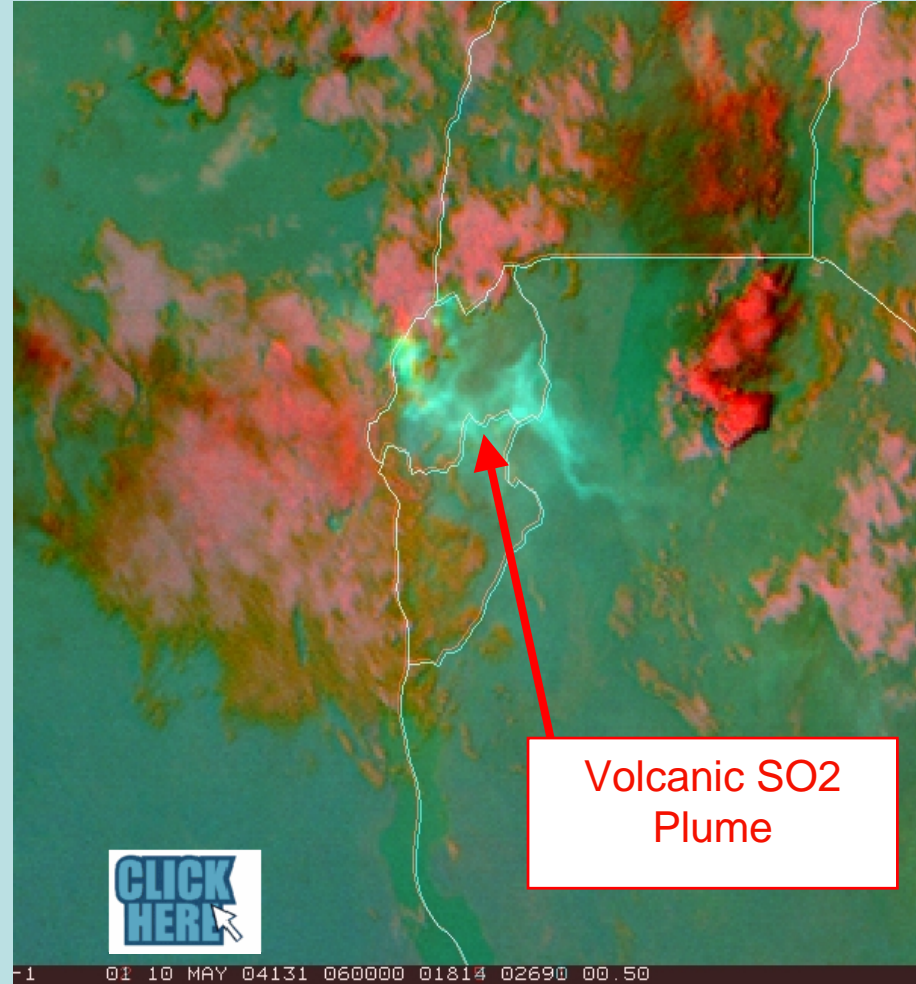


10 May 2004, 06:00 UTC

Nyamuragira Eruption Eastern Kongo

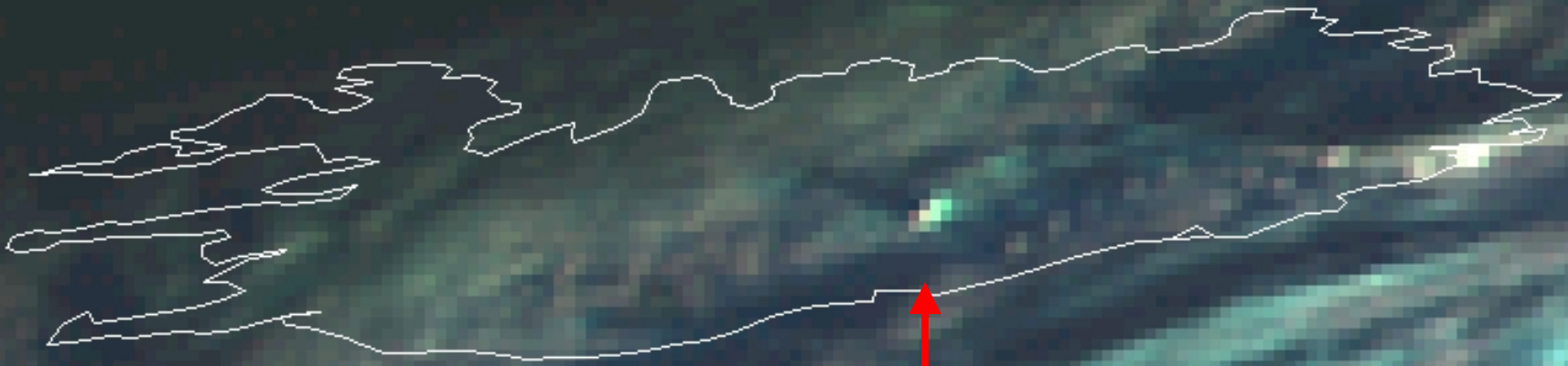


MFG IR Channel i



MSG RGB Composite
VIS0.8, IR10.8-IR8.7, IR12.0-IR8.7

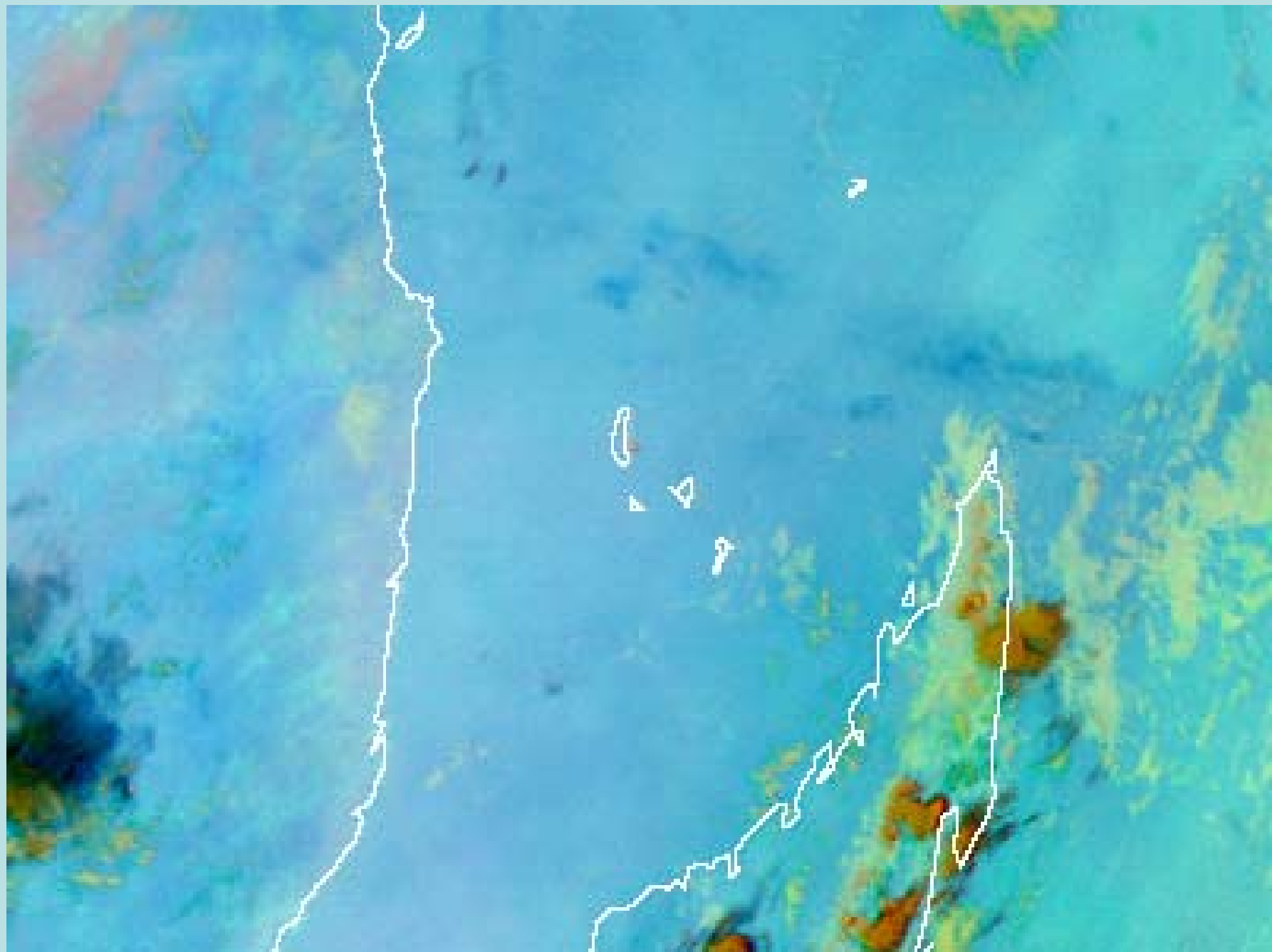
2 November 2004, 09:30 UTC Grimsvötn Eruption Iceland



Volcanic Plume
(steam, ash & SO₂)

MSG, RGB NIR1.6, VIS0.8, VIS0.6





We have seen that Meteosat Second Generation and other satellites provide a wealth of observational data which can be used in a number of ways.

An important development is the possibility to use data to provide early warning and alerting systems, based on the higher resolution, accuracy and timeliness of, e.g. the new satellite Systems

Mitigating Disaster: more than a forecast

- It is clear that meteorological satellites make a significant contribution to forecasting severe weather and its impacts on life and property;
- A forecast is useless if there is no capability to mitigate the predicted impact;
- This is the next major challenge for the environmental and disaster mitigation communities.



2004/01/23 09:57

CH01 0.6

CH04 A3.9

CH09 10.8-CH07 8.7

EUMETSAT Help Desk: ops@eumetsat.int

THANK YOU FOR YOUR ATTENTION !

MSG, 23 Jan 2004, 09:45 UTC, RGB 01,04r,07-09

