

# METEOSAT SECOND GENERATION (MSG)



## METEOROLOGICAL USE OF THE SEVIRI HIGH-RESOLUTION VISIBLE (HRV) CHANNEL

**Contact:** Jochen Kerkmann  
kerkmann@eumetsat.de

**Contributors:** HansPeter Roesli (MeteoSwiss), M. König (EUM)

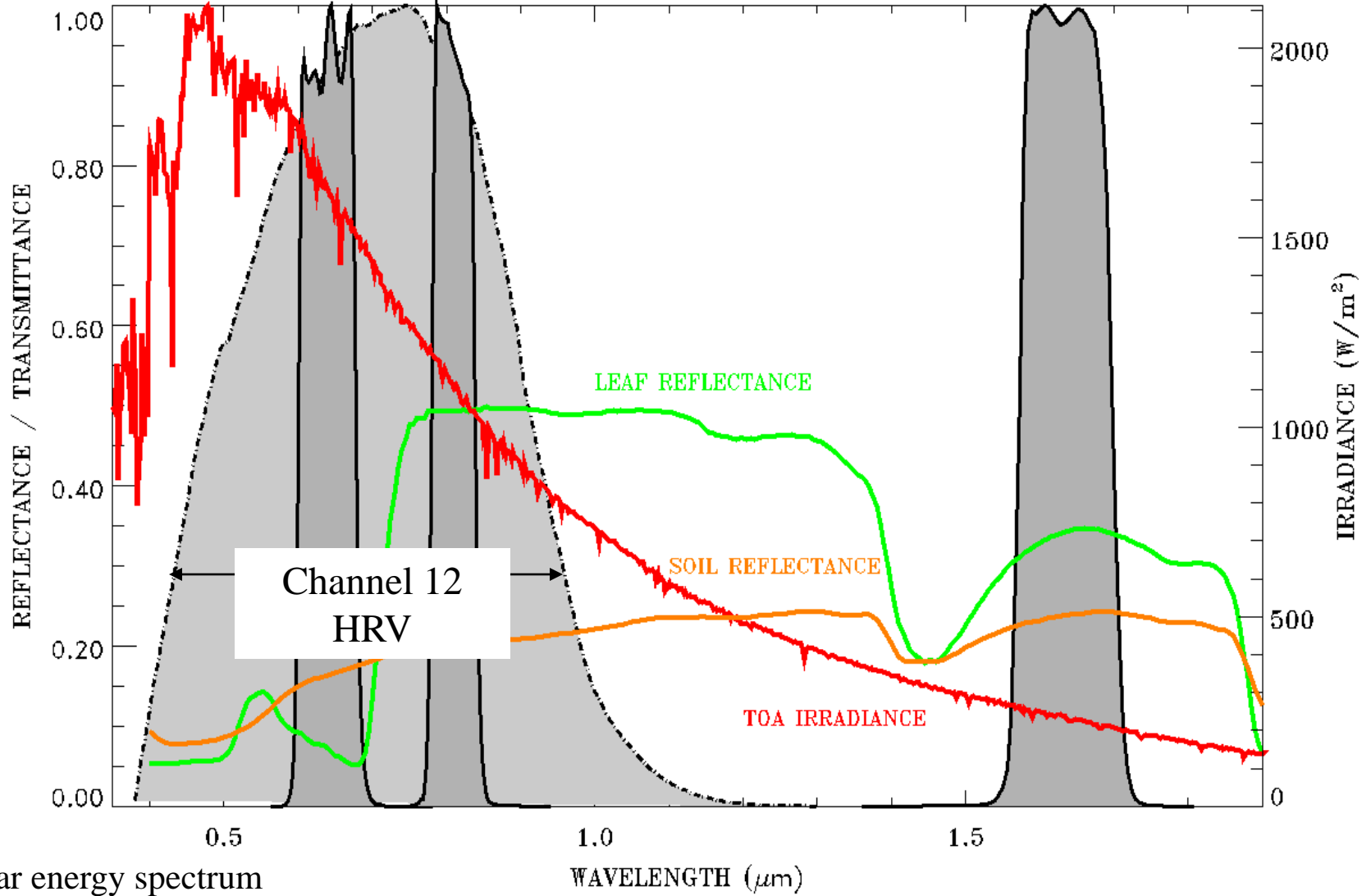
# METEOROLOGICAL USE OF SEVIRI CHANNELS

## High-Resolution Visible (HRV) Channel

- Monitoring of small-scale features
- High-resolution wind vectors

Broadband visible channel, as the current Meteosat VIS channel, but with an improved sampling interval of 1 km

# SEVIRI SOLAR CHANNELS

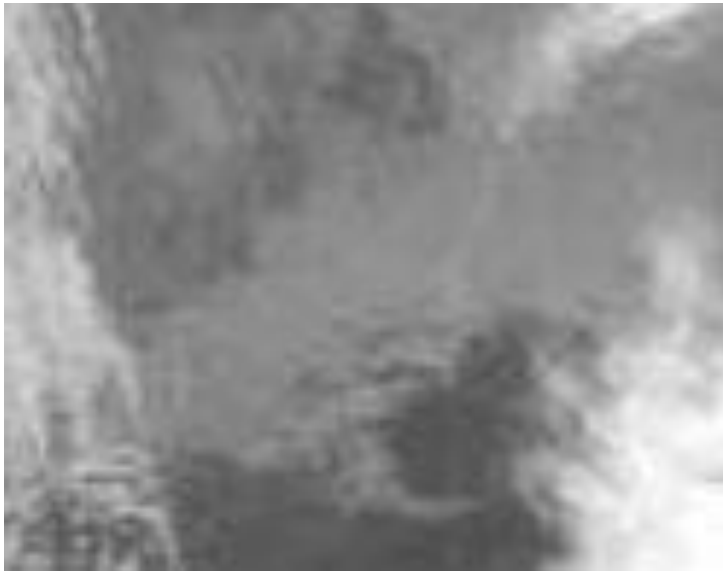


Solar energy spectrum

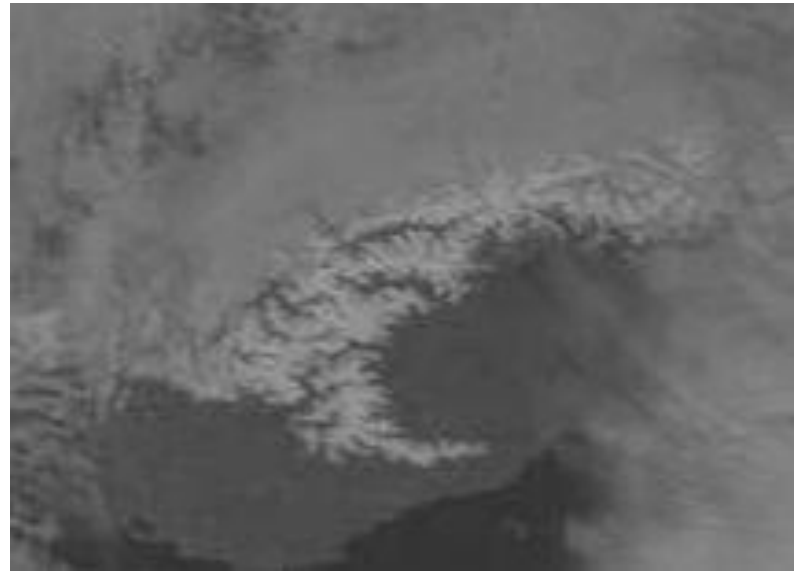
**PART 1:**

**COMPARISON**

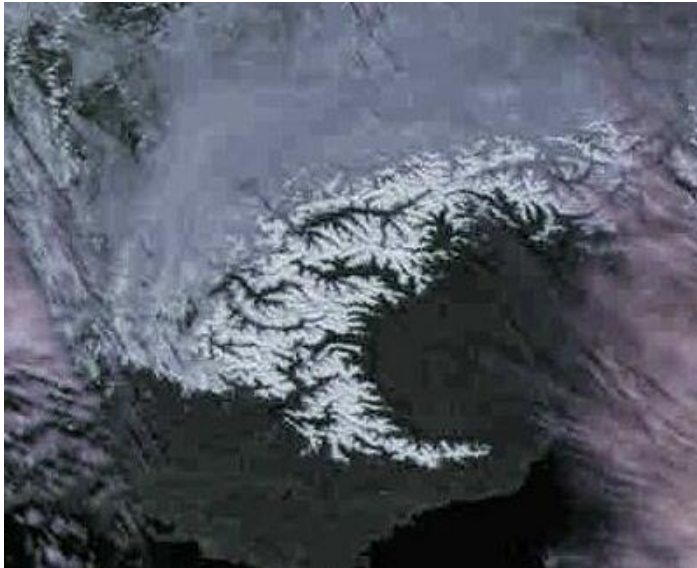
**MFG VIS  $\Leftrightarrow$  MSG HRV**



**Meteosat IR Channel ~ 5 km**



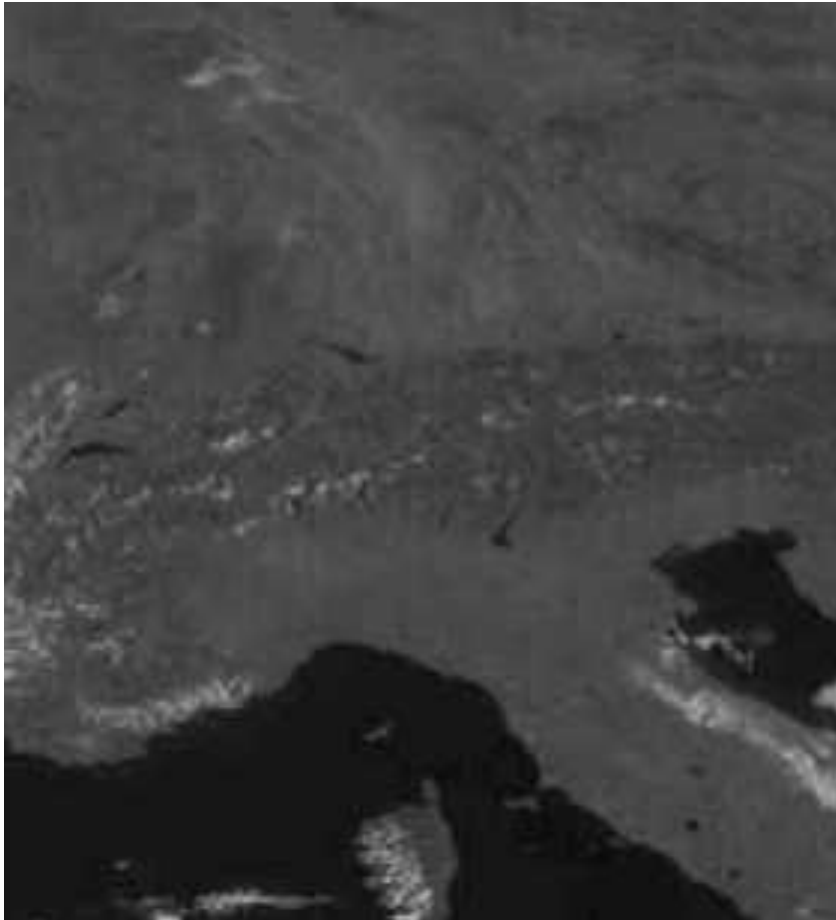
**Meteosat VIS Channel ~ 2.5 km**



**MSG HRV channel ~ 1 km**

**IMPROVED SPATIAL  
SAMPLING WITH THE  
HRV CHANNEL**  
(Example: 4 December 2002,  
12:30 UTC)

# IMPROVED SPATIAL SAMPLING WITH THE HRV CHANNEL (Example: 26 September 2003, 10:00 UTC)

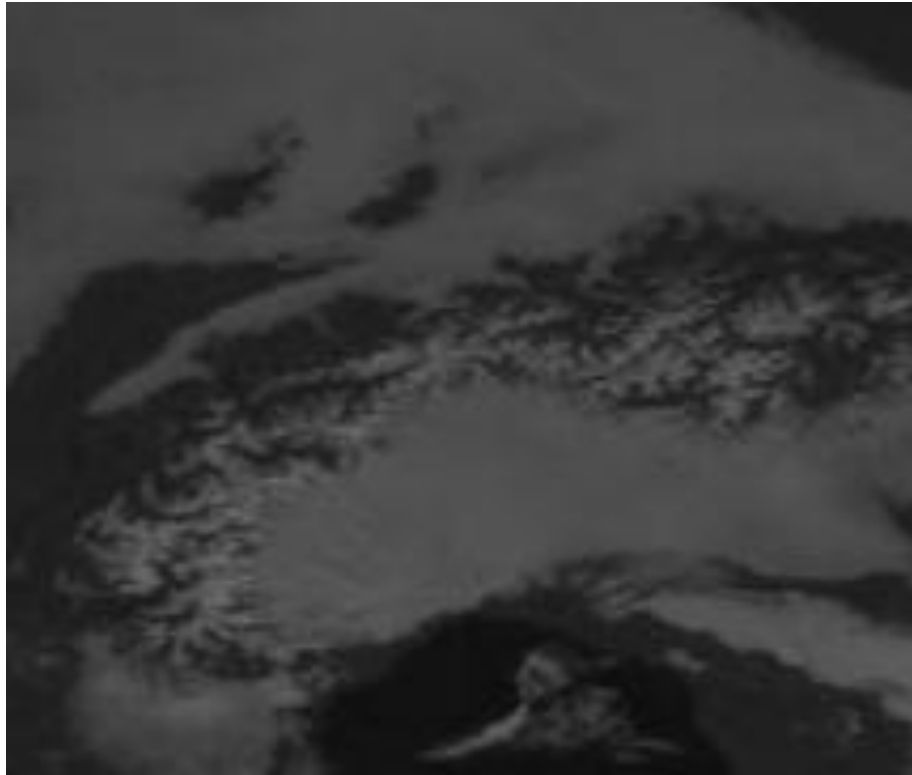


**Meteosat-7 VIS Channel 2.5 km**



**MSG-1 HRV Channel 1 km**

# IMPROVED SPATIAL SAMPLING WITH THE HRV CHANNEL (Example: 11 November 2003, 11:00 UTC)



**Meteosat-6 VIS Channel 2.5 km**

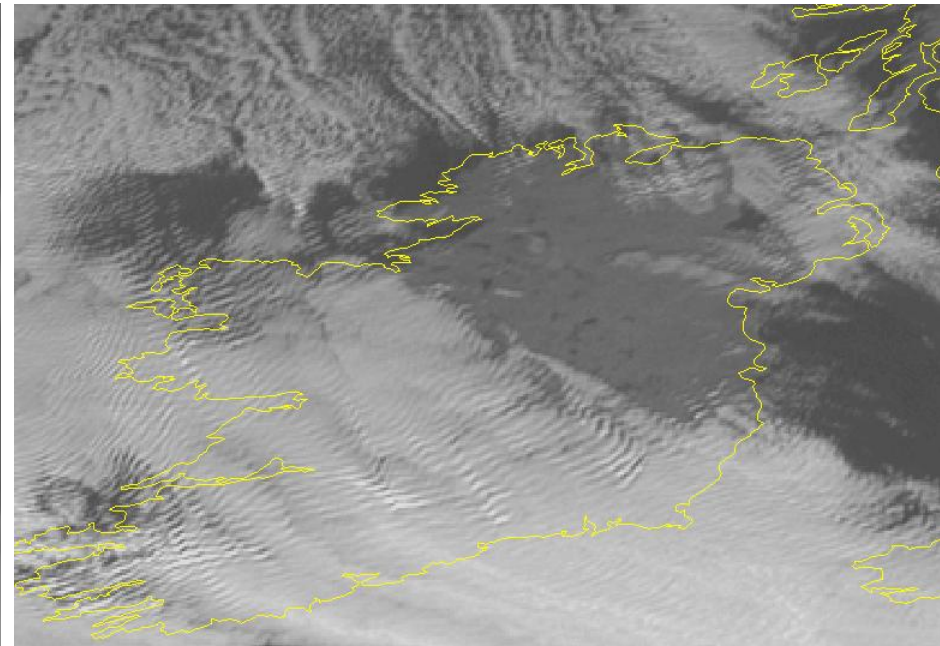


**MSG-1 HRV Channel 1 km**

# IMPROVED SPATIAL SAMPLING WITH THE HRV CHANNEL (Example: 8 December 2003, 11:45 UTC)



**Meteosat-7 VIS Channel 2.5 km**



**MSG-1 HRV Channel 1 km**



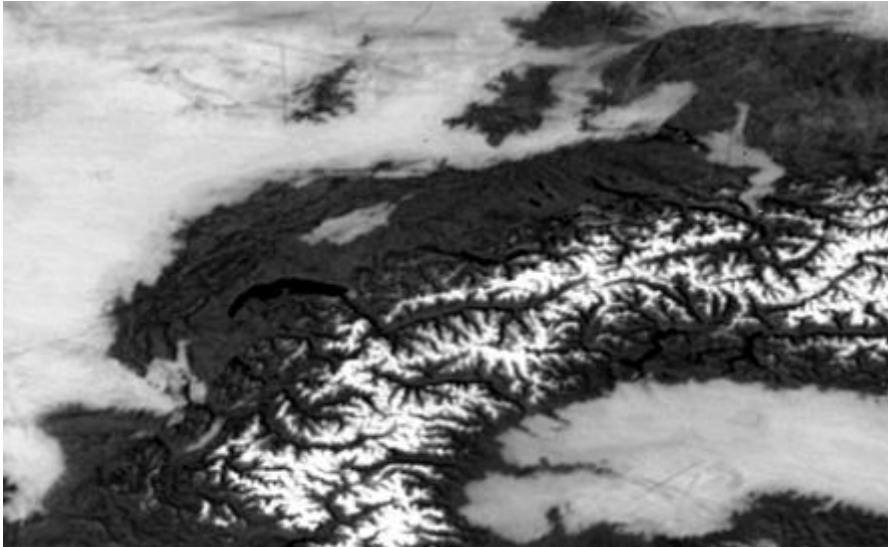
**PART 2:**

**COMPARISON**

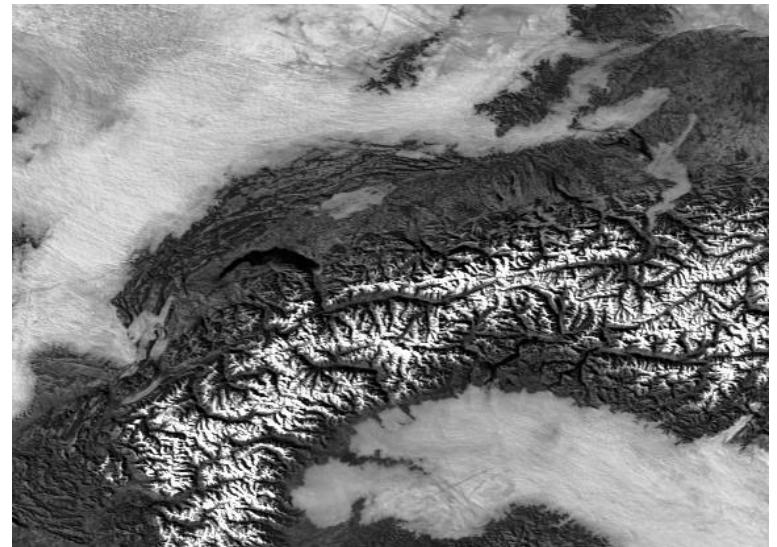
**MSG HRV  $\Leftrightarrow$  NOAA AVHRR**

# Shallow Fog in the Po Valley

- MSG-1 HRV vs NOAA-16 AVHRR CH2 -



MSG-1 HRV Channel, 13:00 UTC

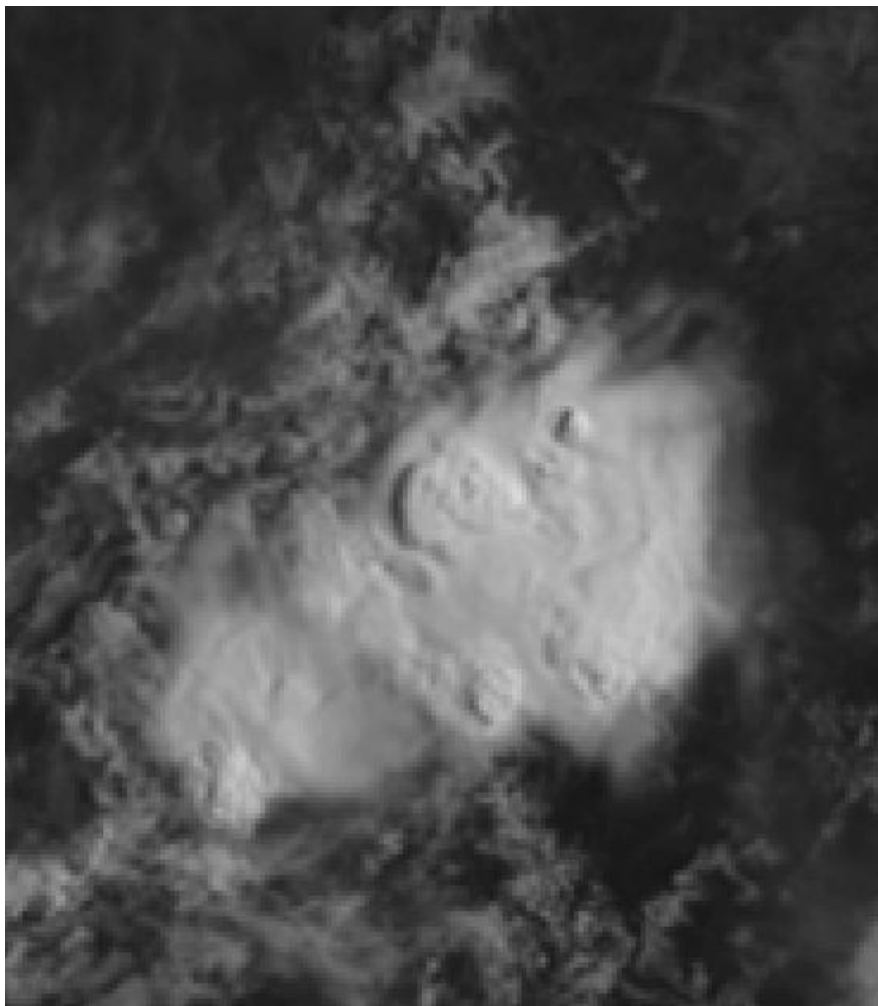


AVHRR Channel 2, 13:02 UTC

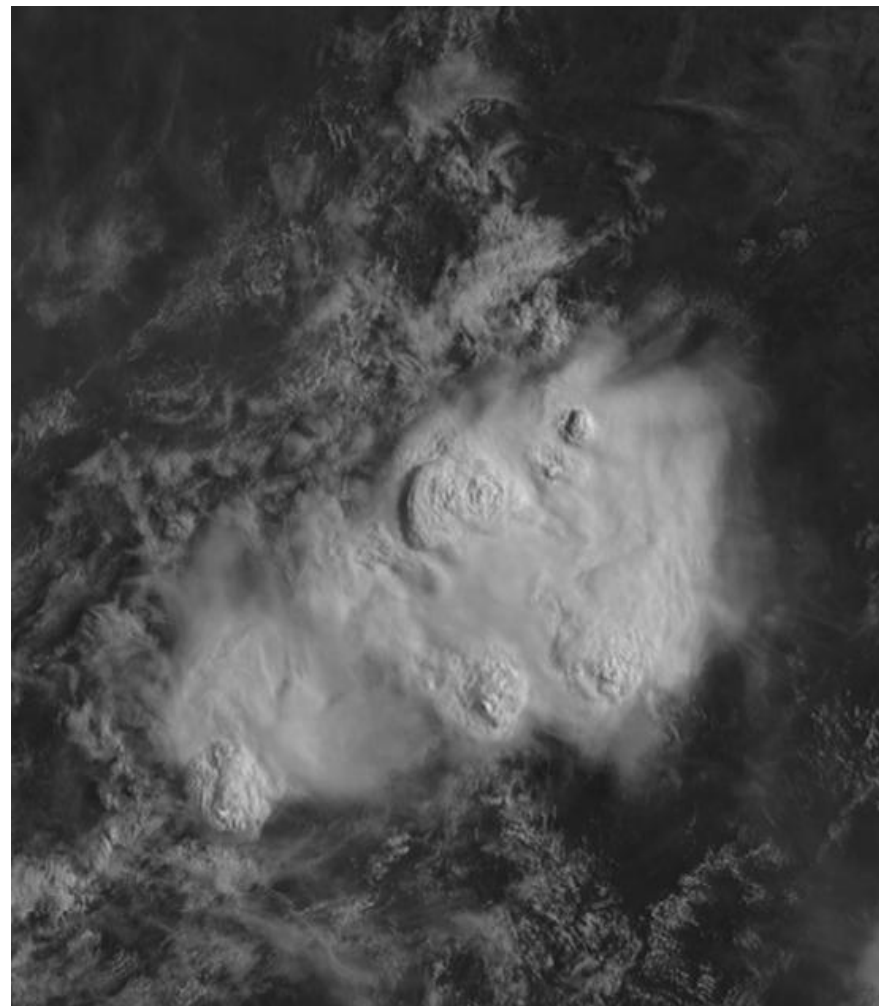
19 November 2003

# PART 3:

## COMPARISON VIS0.6/VIS0.8 $\Leftrightarrow$ HRV

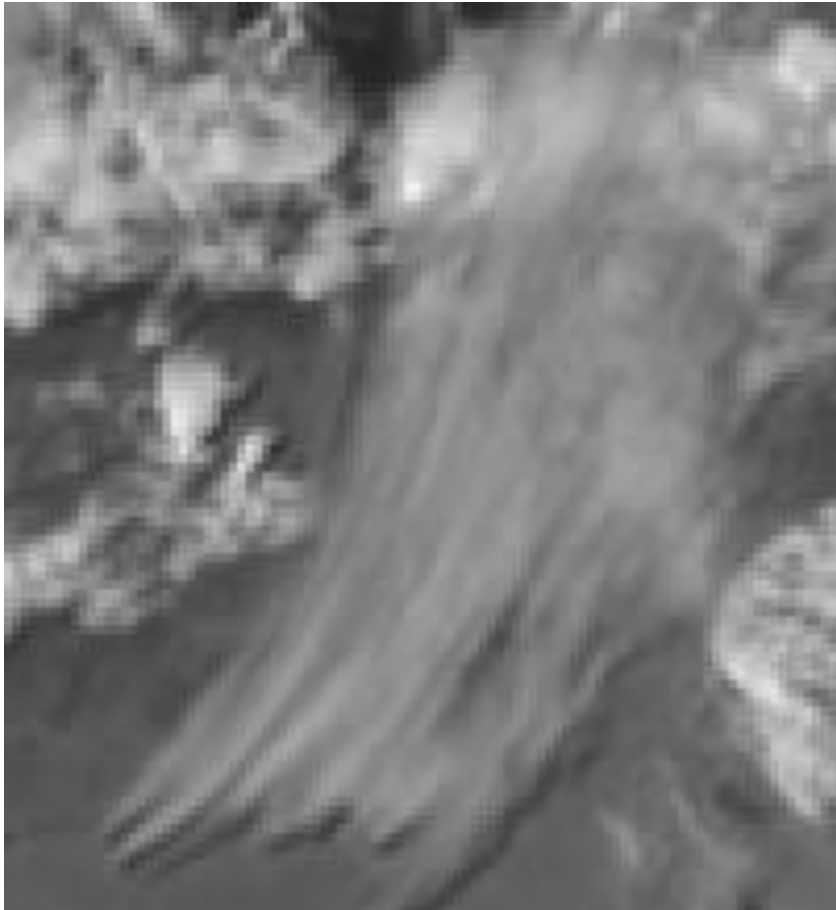


Visible 0.6  $\mu\text{m}$

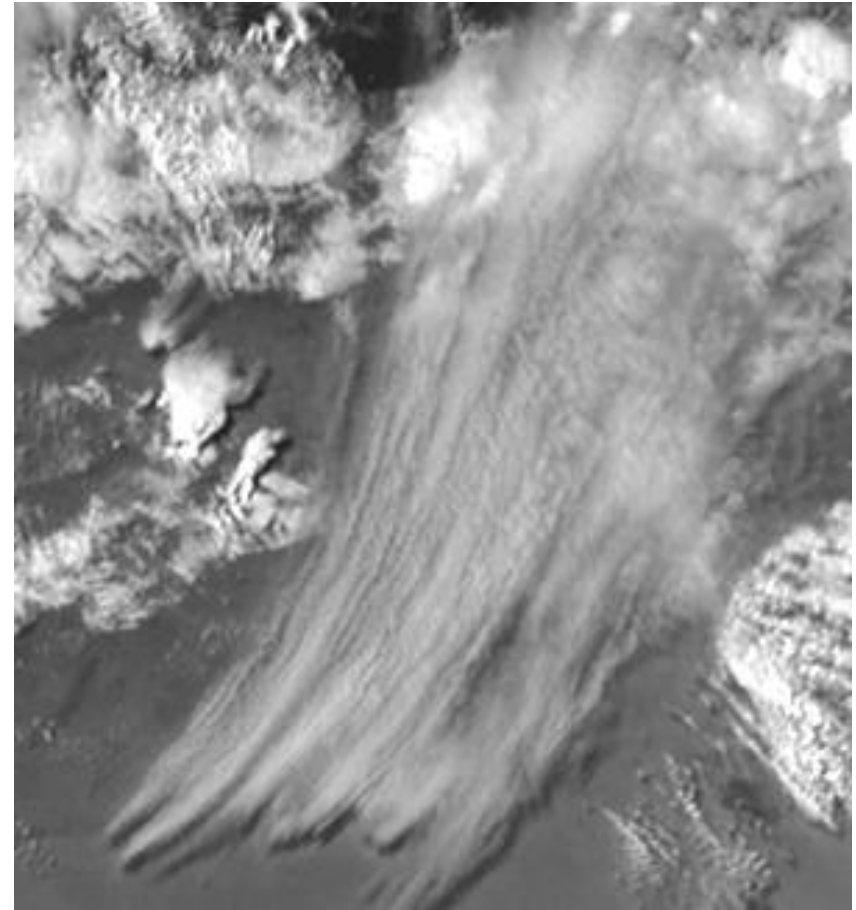


High-res. Visible

**Cb clouds** over Nigeria as seen in the high-res. visible channel  
MSG-1, 24 April 2003, 08:00 UTC



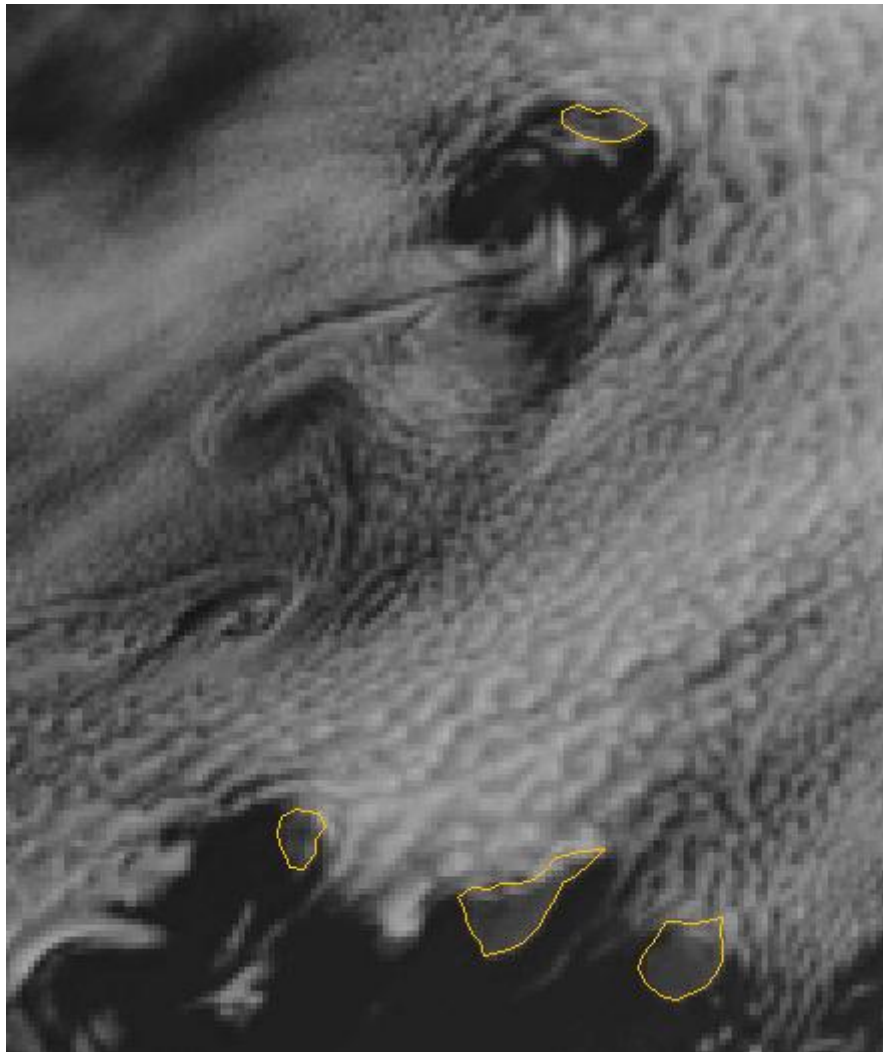
Visible 0.6  $\mu\text{m}$



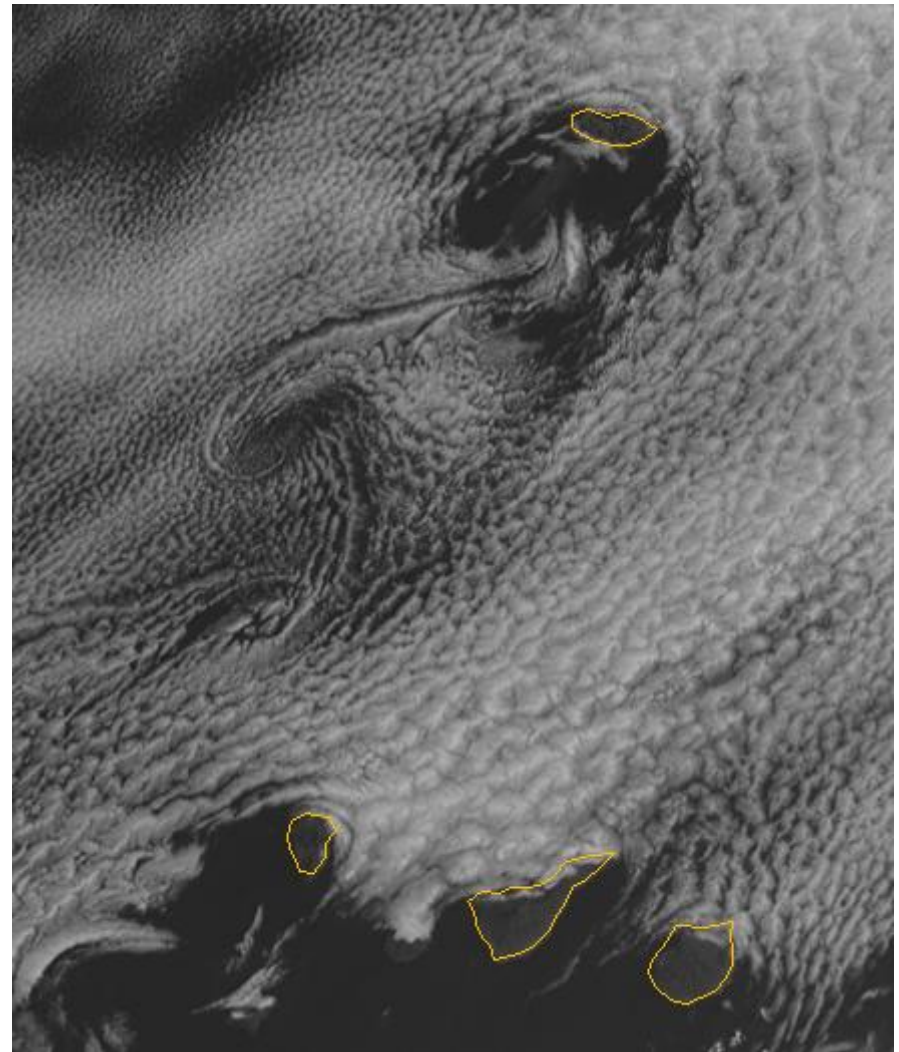
High-res. Visible

**Cirrus clouds** over the Algerian desert as seen in the high-res. visible channel  
MSG-1, 9 May 2003, 14:00 UTC





Visible 0.8  $\mu\text{m}$



High-res. Visible

**Von Karman Vortex Streets** as seen in the high-res. visible channel  
MSG-1, 6 June 2003, 09:00 UTC

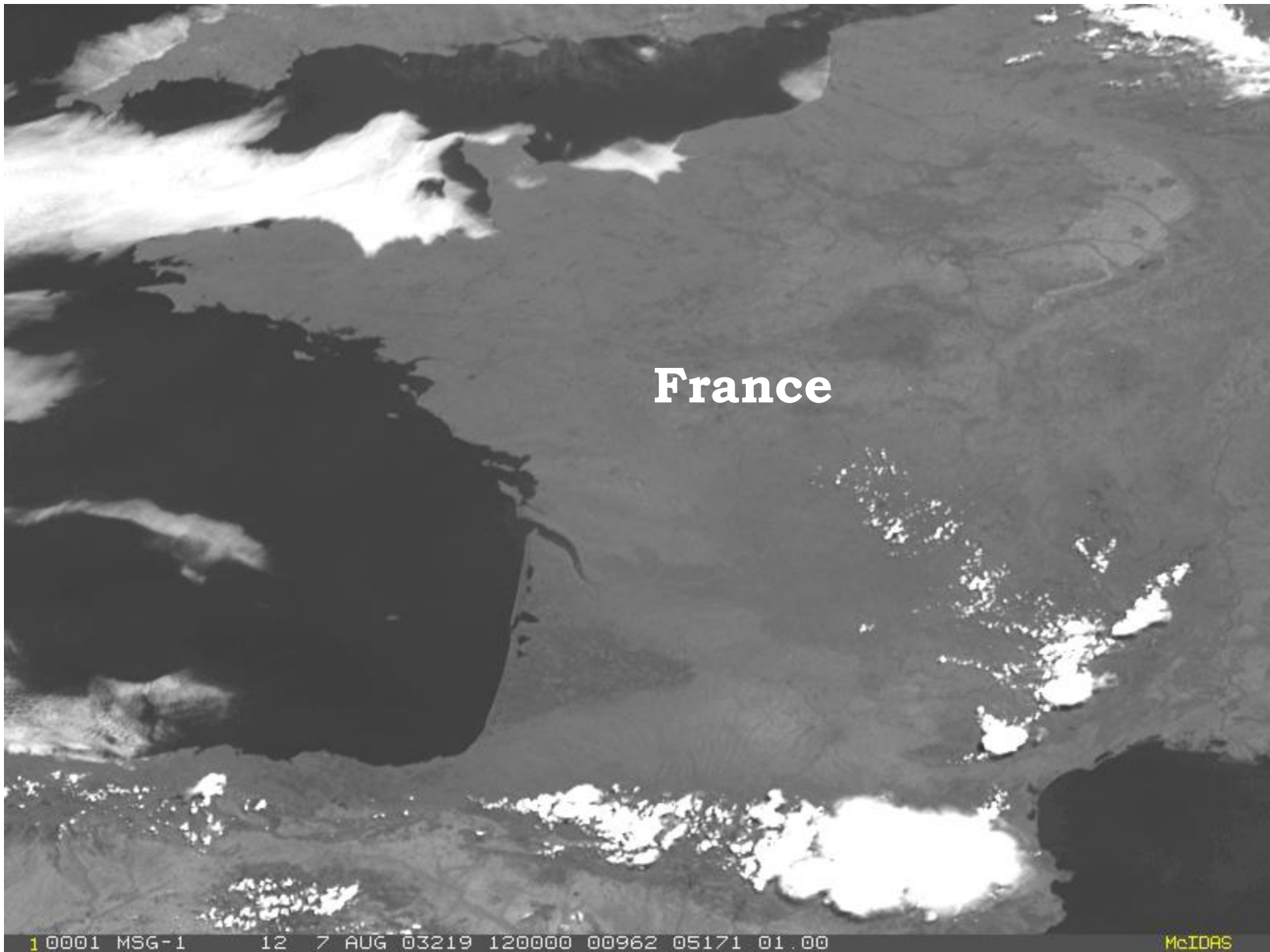
**PART 4:**

**EXAMPLES OF  
CLOUD-FREE SITUATIONS  
OVER EUROPE**

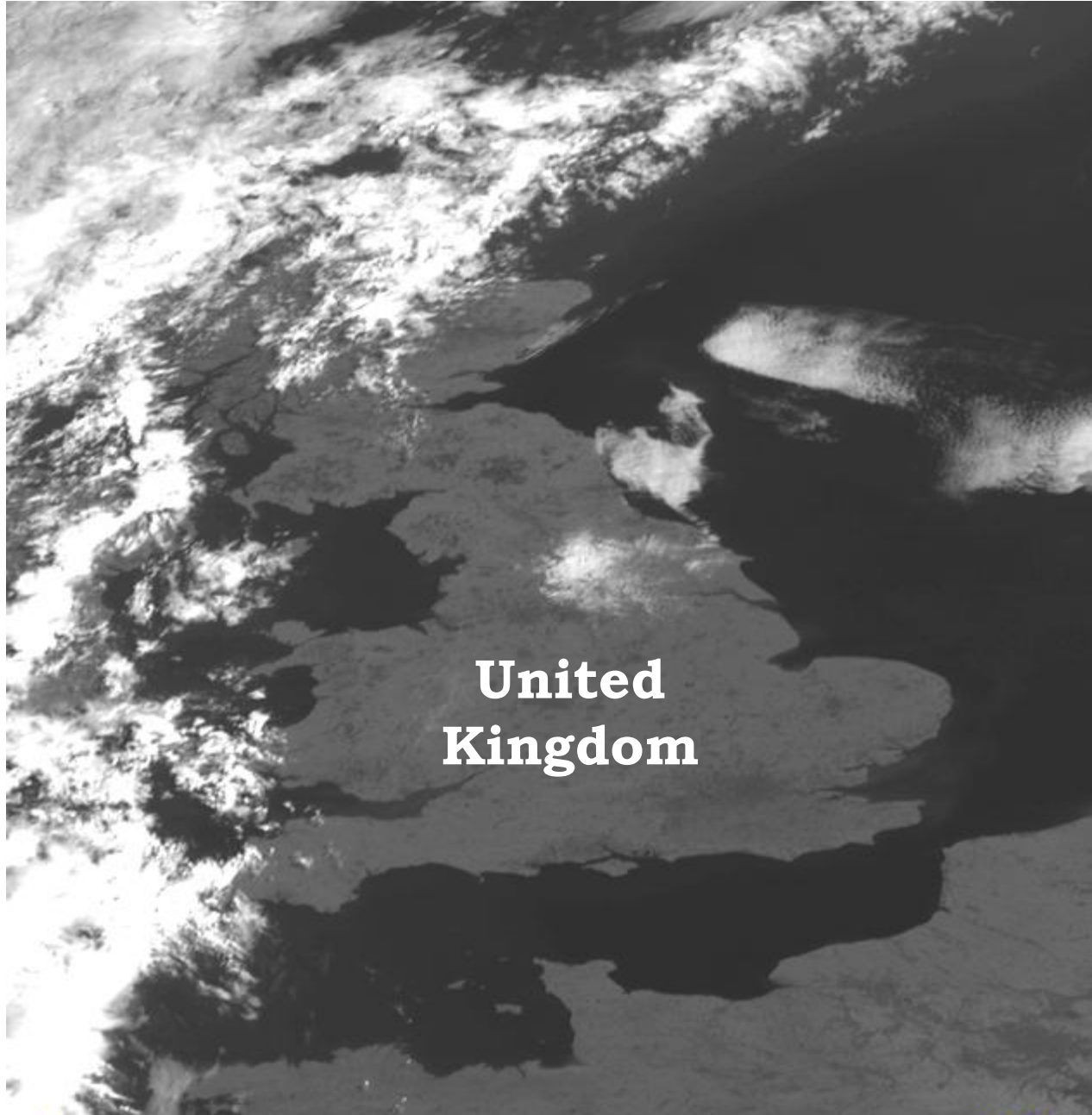


MSG-1, 4 Aug 2003, 12:00 UTC, Channel 12 (HRV)





MSG-1, 7 Aug 2003, 12:00 UTC, Channel 12 (HRV)



**United  
Kingdom**

MSG-1  
14 July 2003  
10:00 UTC  
Channel 12  
(HRV)

1 0001 MSG-1 12 14 JUL 03195 100000 00484 05133 01.00 McIDAS

A satellite image showing the coastline of the Netherlands. The land is a dark greyish-brown, and the sea is a lighter grey. The coastline is irregular with many small inlets and peninsulas. The text 'The Netherlands' is overlaid in white in the center of the image.

# The Netherlands

MSG-1  
14 July 2003  
10:00 UTC  
Channel 12  
(HRV)

1 0001 MSG-1 12 14 JUL 03195 100000 00751 05733 00.50 McIDAS

A grayscale satellite image of Denmark, showing the country's coastline and surrounding waters. The word "Denmark" is overlaid in white text in the upper left quadrant of the image.

**Denmark**

MSG-1  
14 July 2003  
10:00 UTC  
Channel 12  
(HRV)

1 0001 MSG-1 12 14 JUL 03195 100000 00607 06003 00.50 McIDAS

A grayscale satellite image of Norway, showing the coastline and inland terrain. The word "Norway" is overlaid in white text in the lower-left quadrant of the image.

Norway

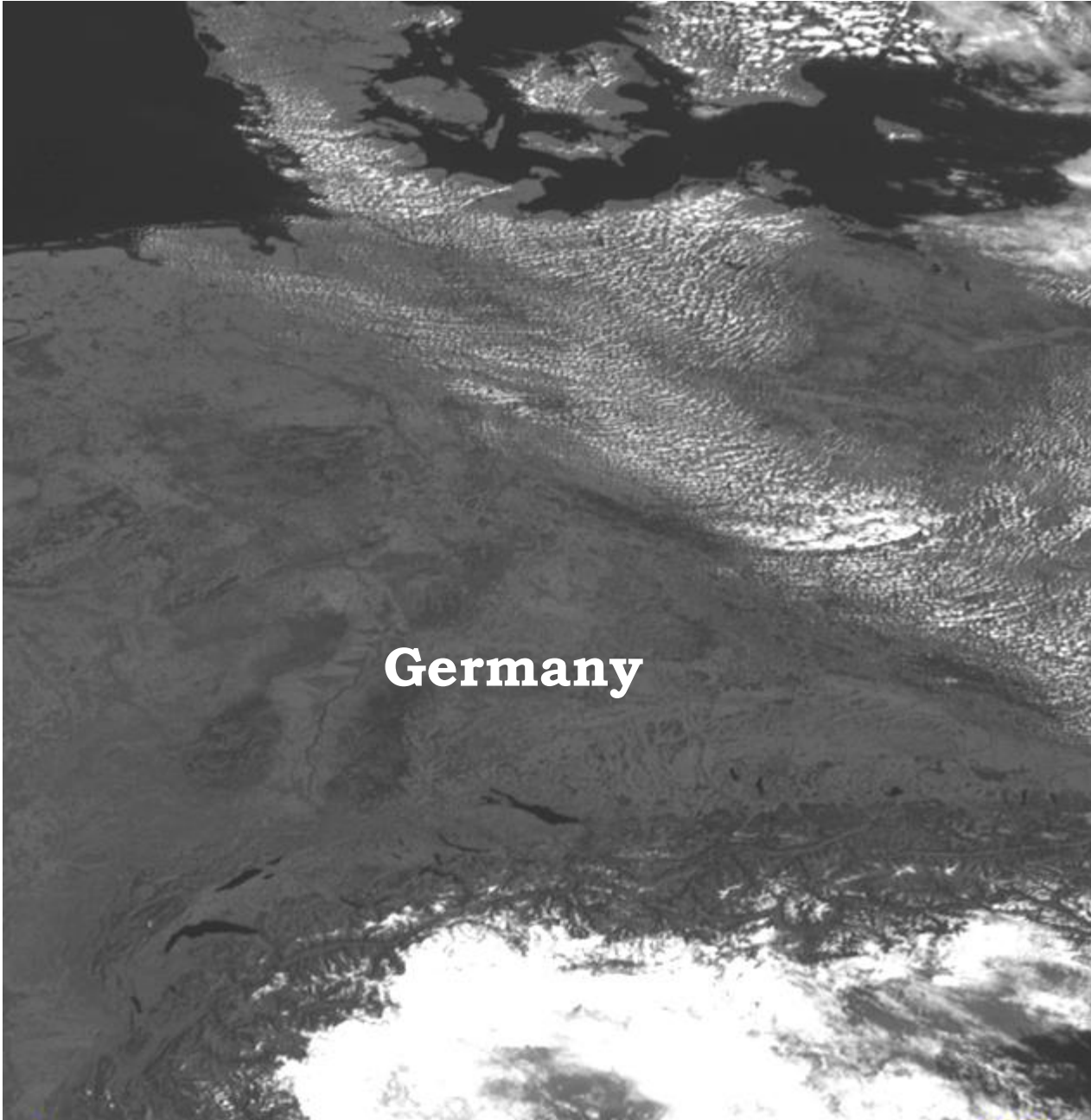
MSG-1  
14 July 2003  
10:00 UTC  
Channel 12  
(HRV)

1 0001 MSG-1 12 14 JUL 03195 100000 00354 05783 00.50 McIDAS



MSG-1, 7 Sep 2003, 12:45 UTC, Channel 12 (HRV)



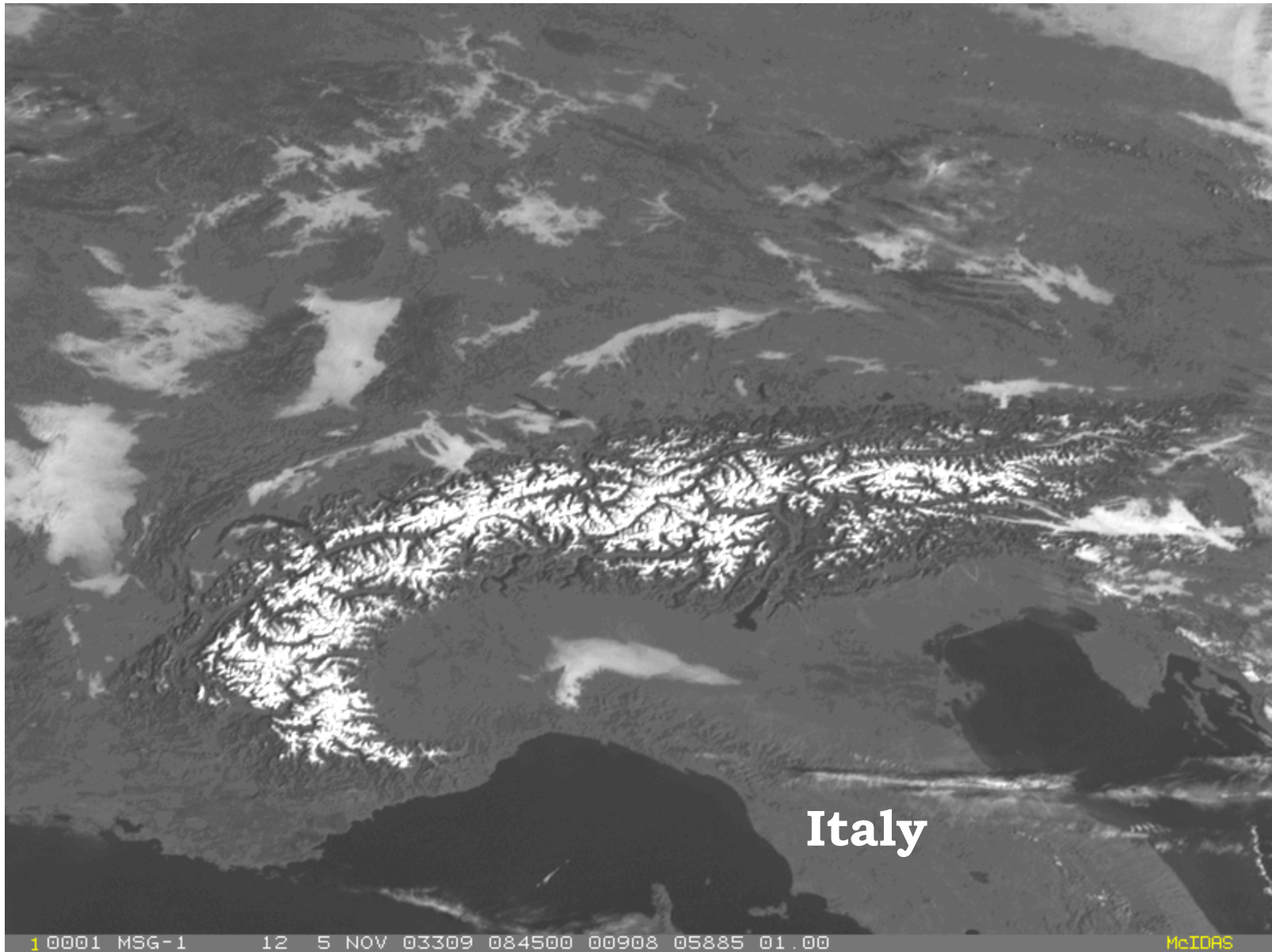


**Germany**

MSG-1  
14 July 2003  
10:00 UTC  
Channel 12  
(HRV)

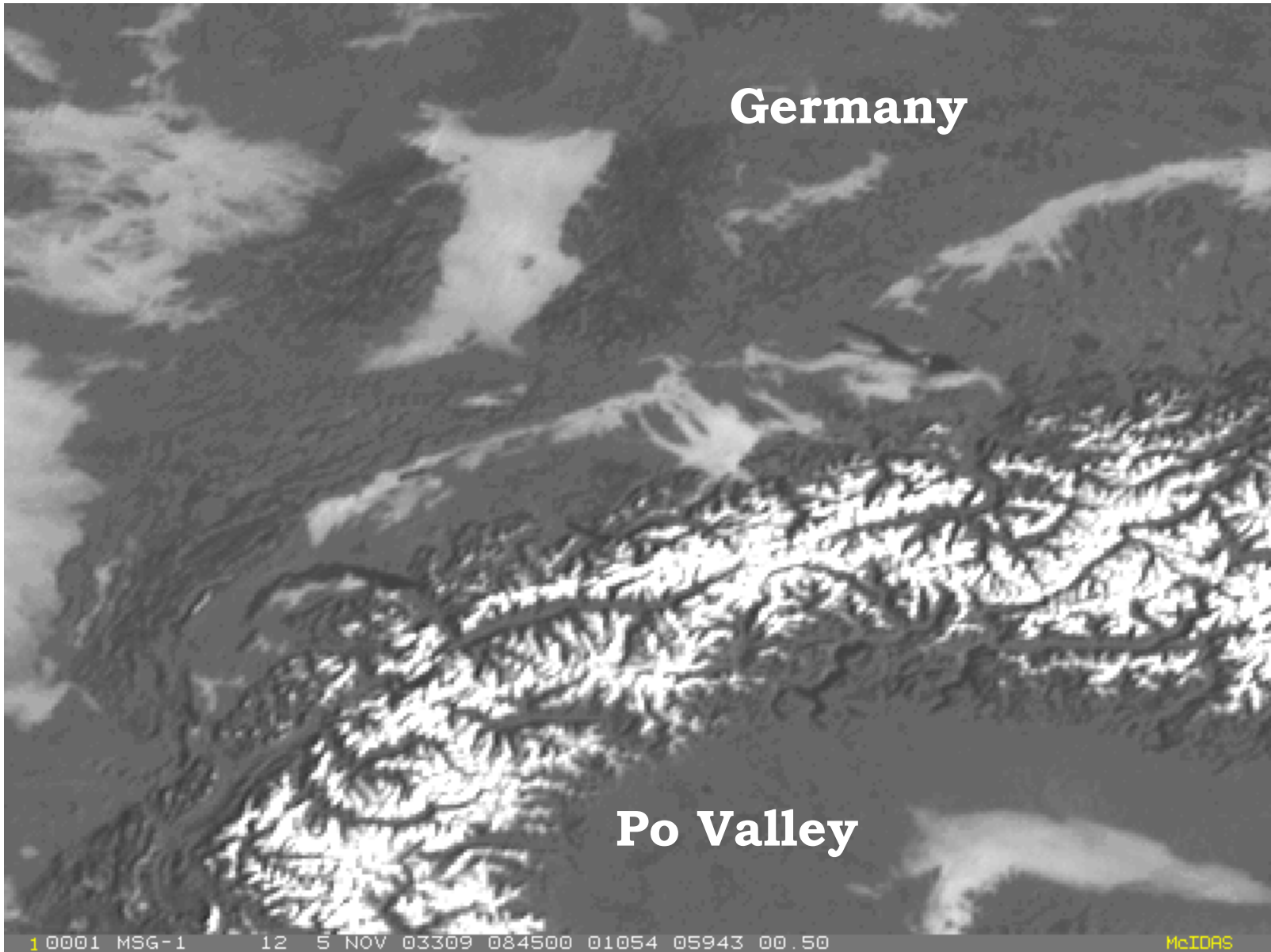
1 0001 MSG-1 12 14 JUL 03195 100000 00701 05925 01.00 McIDAS



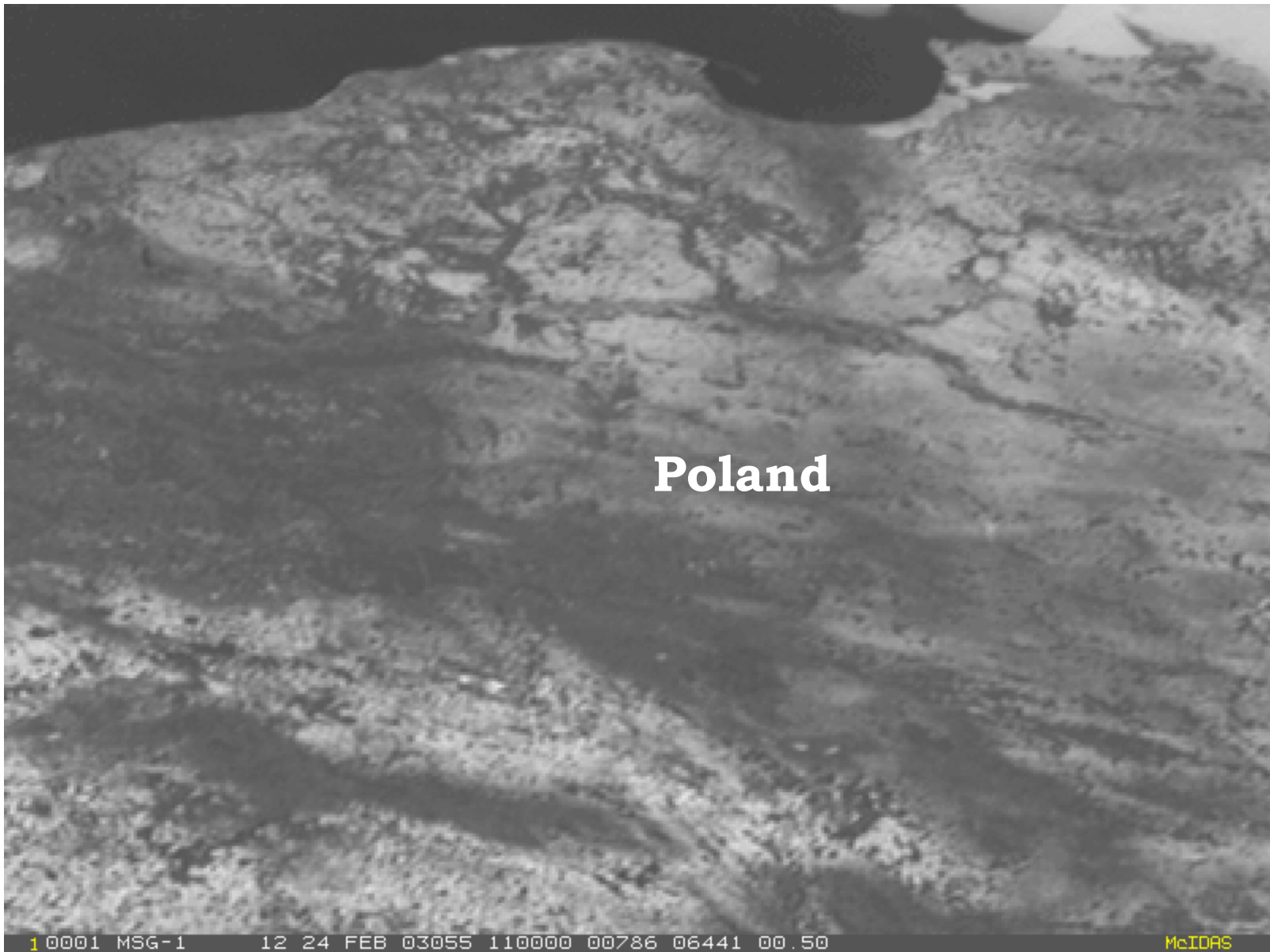


MSG-1, 5 Nov 2003, 08:45 UTC, Channel 12 (HRV)

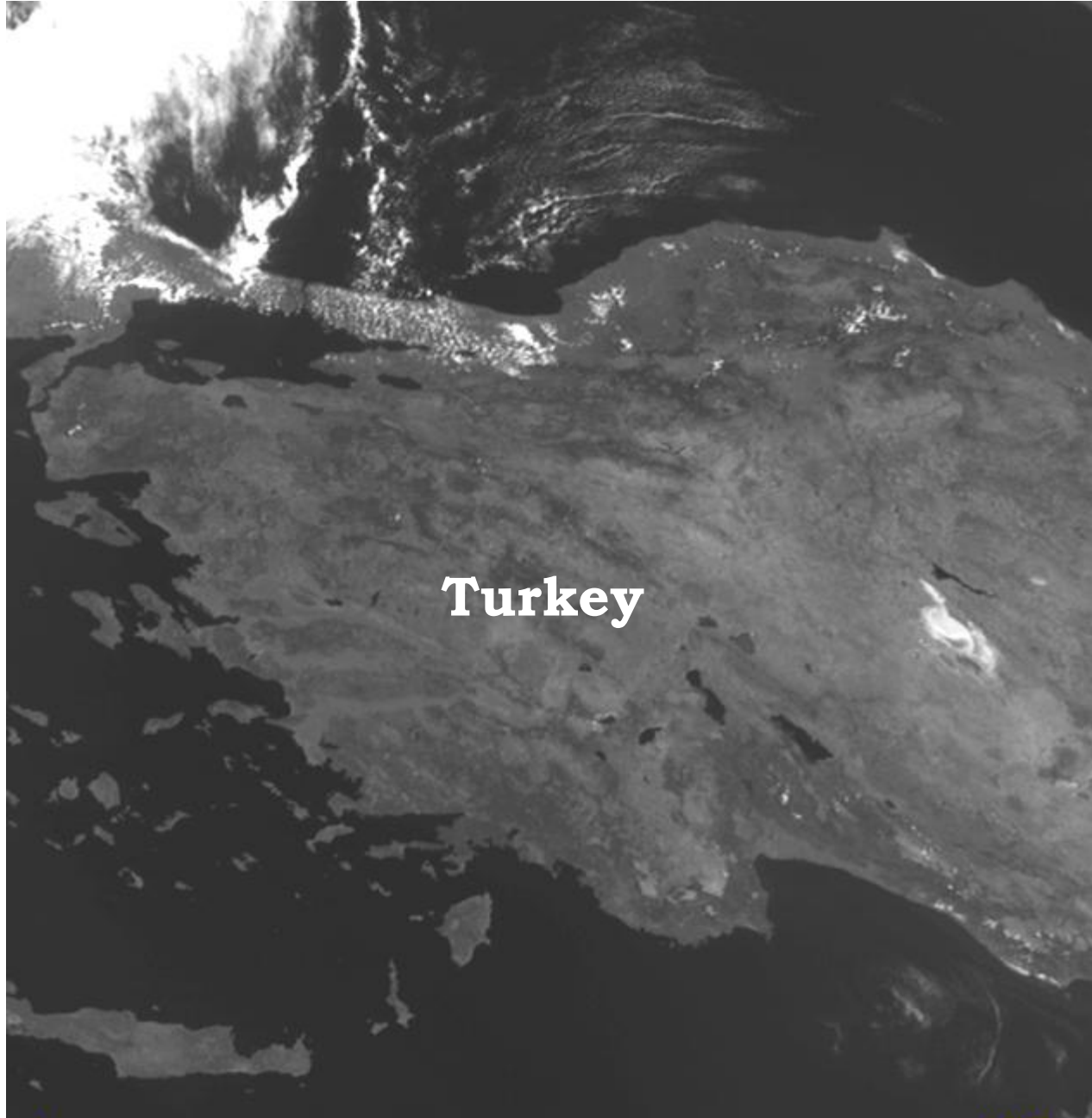




MSG-1, 5 Nov 2003, 08:45 UTC, Channel 12 (HRV)



MSG-1, 24 Feb 2003, 11:00 UTC, Channel 12 (HRV)



Turkey

MSG-1  
14 July 2003  
10:00 UTC  
Channel 12  
(HRV)

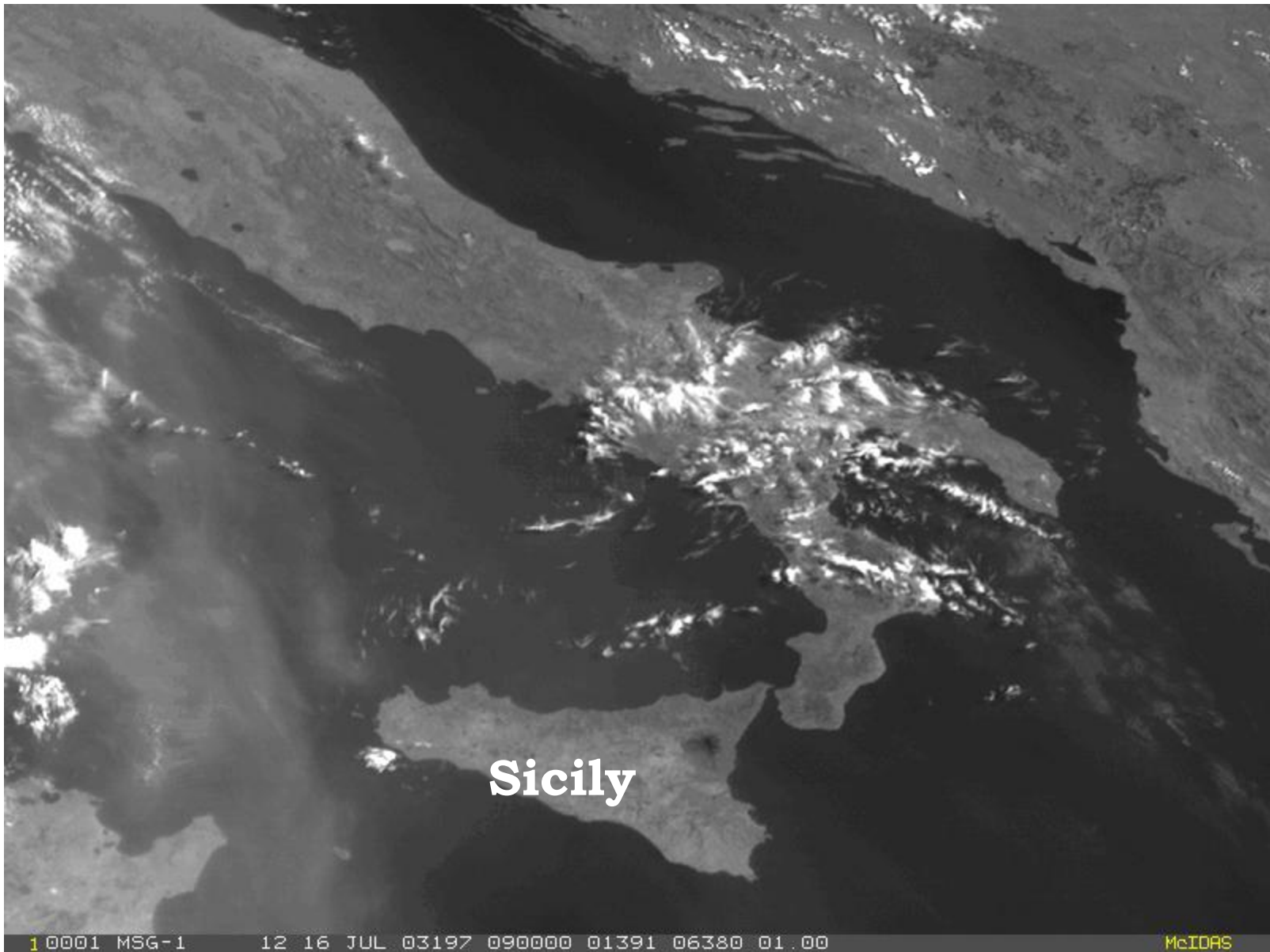
1 0001 MSG-1 12 14 JUL 03195 100000 01490 07597 01.00 McIDAS



Greece

MSG-1  
14 July 2003  
10:00 UTC  
Channel 12  
(HRV)

10001 MSG-1 12 14 JUL 03195 100000 01617 07233 01.00 McIDAS

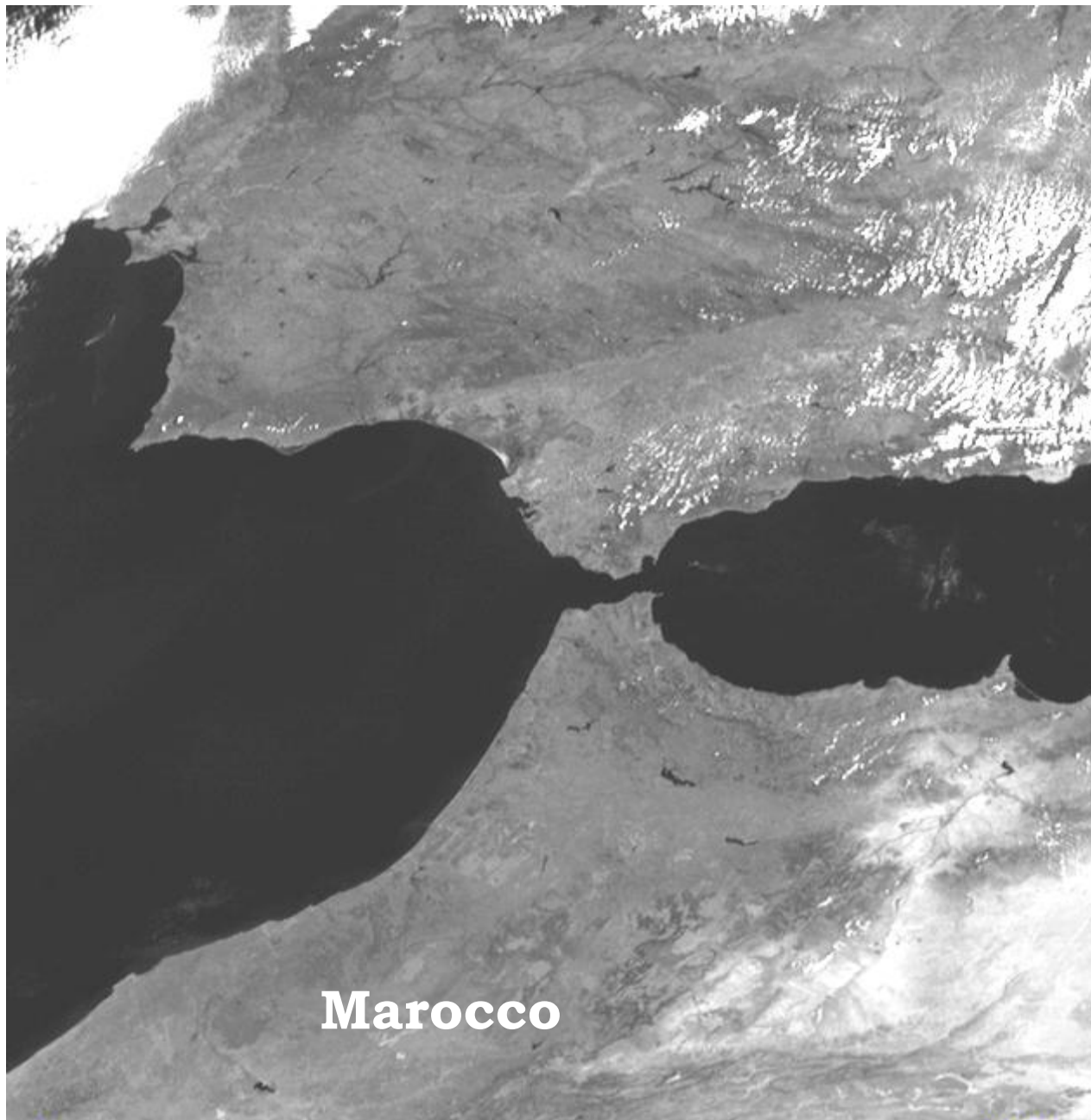


MSG-1, 16 July 2003, 09:00 UTC, Channel 12 (HRV)

**PART 5:**

**EXAMPLES OF  
CLOUD-FREE SITUATIONS  
OVER AFRICA**





MSG-1  
9 May 2003  
10:00 UTC  
Channel 12  
(HRV)

1 0001 MSG-1 12 9 MAY 03129 100000 01650 04734 01.00 McIDAS

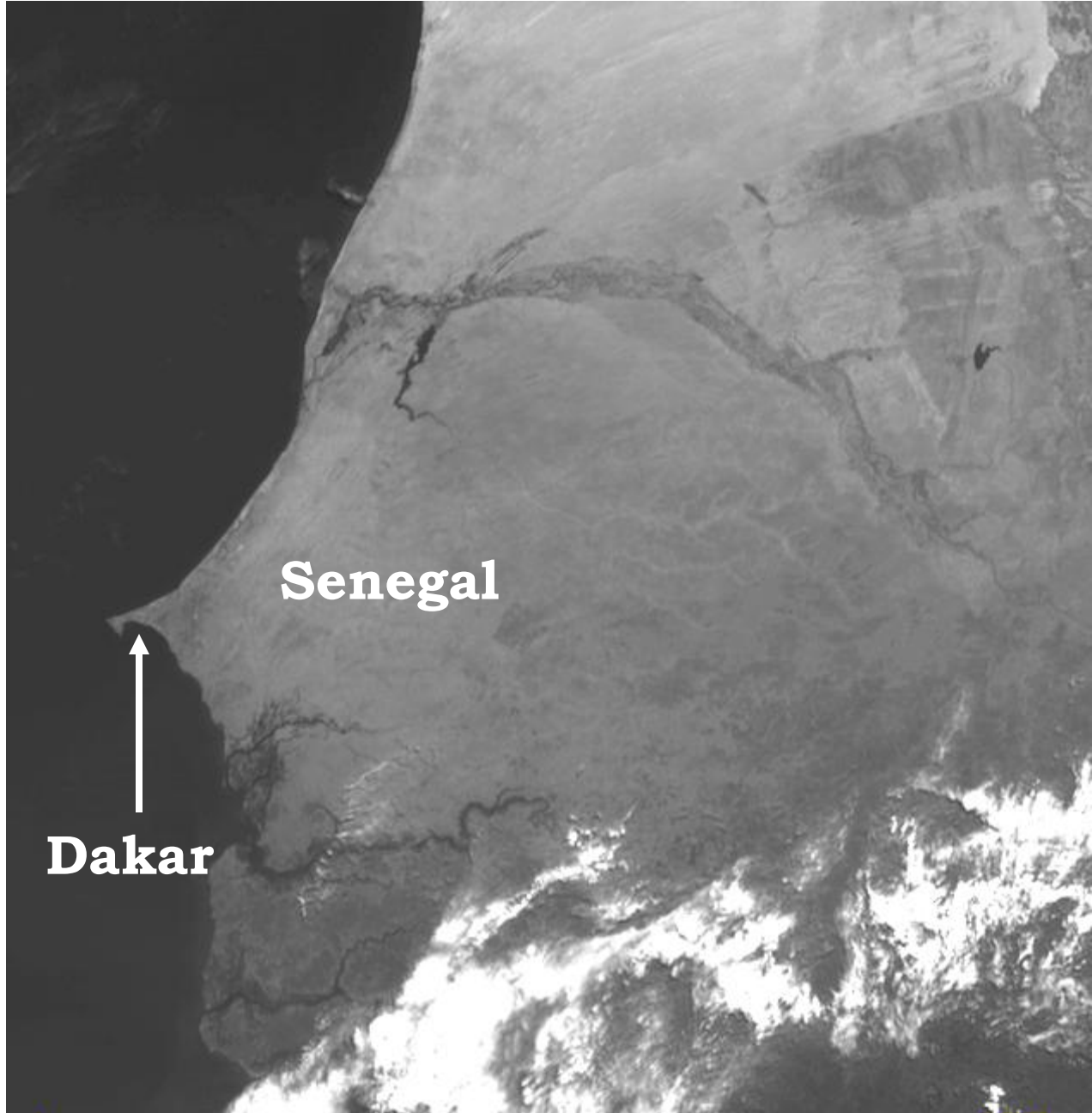
A grayscale satellite image of the northwestern coast of Africa, showing the coastline of Mauretania. The land is light gray, and the sea to the west is dark. The word "Mauretania" is overlaid in white text.

# Mauretania

MSG-1  
9 May 2003  
12:00 UTC  
Channel 12  
(HRV)

1 0001 MSG-1 12 9 MAY 03129 120000 03113 03730 01.00 McIDAS



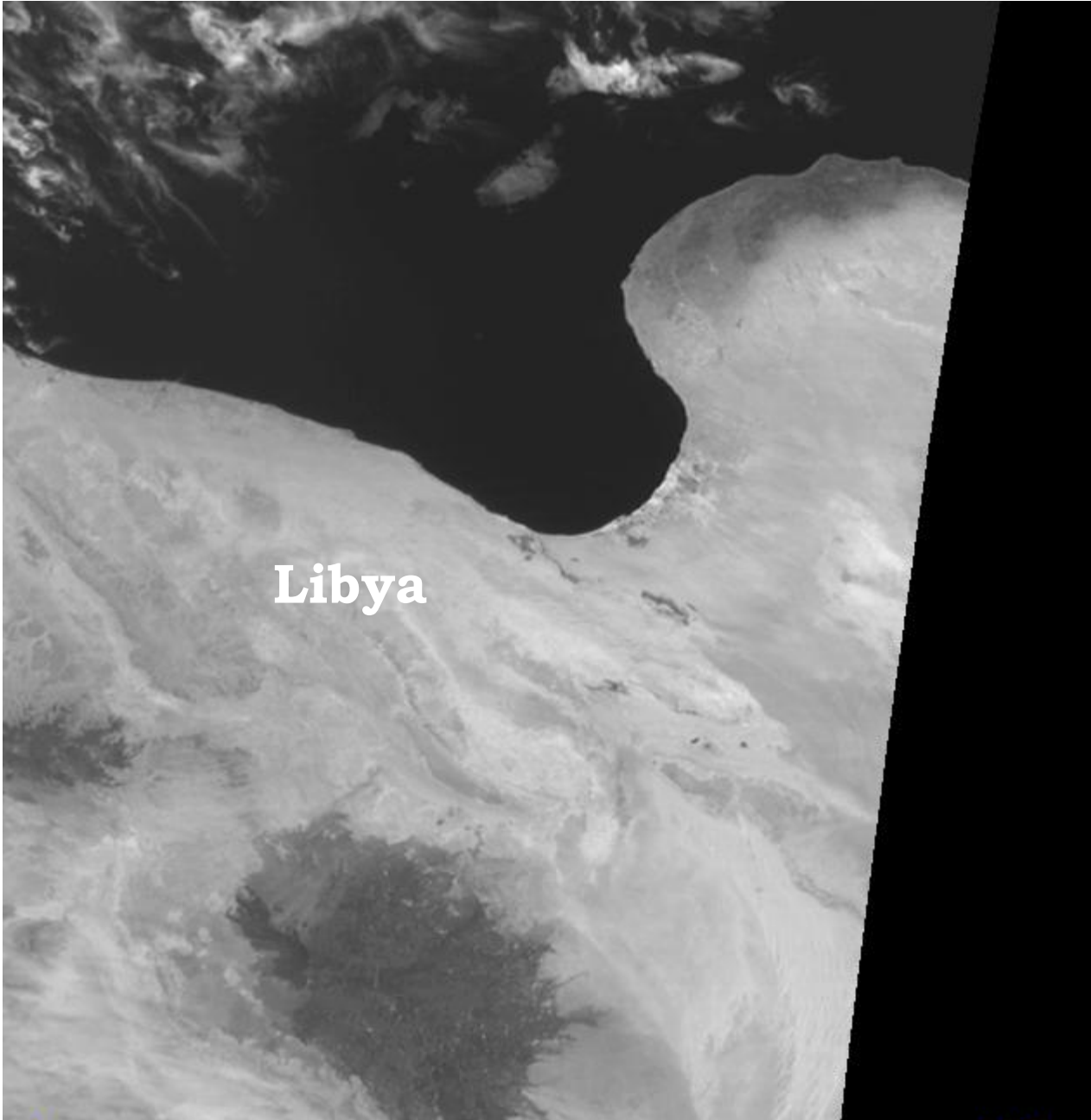


Senegal

Dakar

MSG-1  
9 May 2003  
12:00 UTC  
Channel 12  
(HRV)

1 0001 MSG-1 12 9 MAY 03129 120000 03623 03681 01.00 McIDAS



Libya

MSG-1  
9 May 2003  
10:00 UTC  
Channel 12  
(HRV)

1 0001 MSG-1 12 9 MAY 03129 100000 02181 06998 01.00 McIDAS

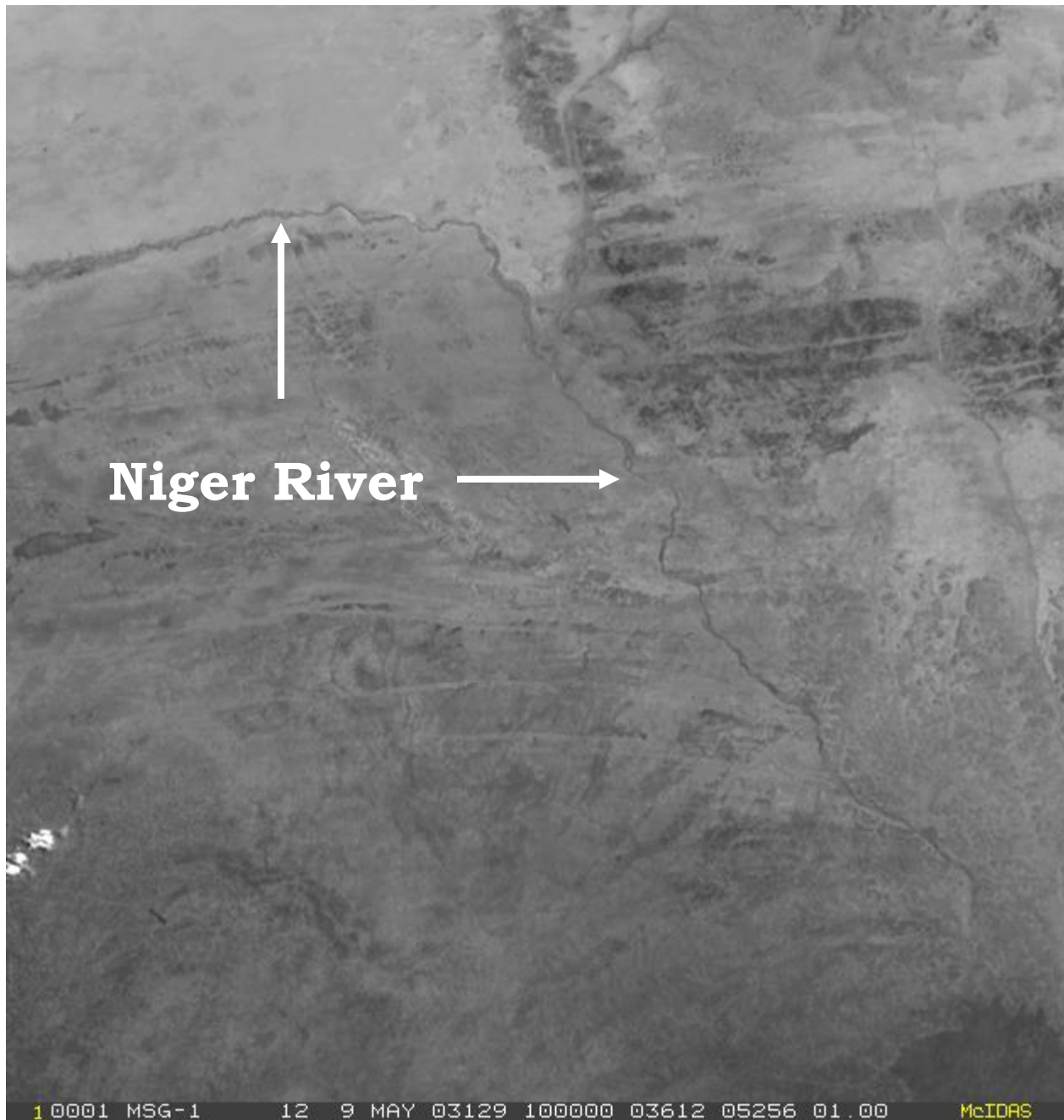


A grayscale satellite image of Egypt, showing the Nile River valley and surrounding desert terrain. The word "Egypt" is overlaid in white text in the center of the image.

Egypt

MSG-1  
5 June 2003  
10:00 UTC  
Channel 12  
(HRV)

40004 MSG-1 12 5 JUN 03156 100000 02221 07897 01.00



**Niger River**

MSG-1  
9 May 2003  
10:00 UTC  
Channel 12  
(HRV)

1 0001 MSG-1 12 9 MAY 03129 100000 03612 05256 01.00 McIDAS

A satellite image of South Africa, showing a large, bright, snow-covered mountain range in the center. The surrounding terrain is dark and appears to be forested or vegetated. A red arrow points from the text 'Snow in the Drakensberg Mountains' to the snow-covered area.

**South Africa**

**Snow** →  
**in the**  
**Drakensberg**  
**Mountains**

MSG-1  
29 July 2004  
09:00 UTC  
Channel 12  
(HRV)

**PART 6:**

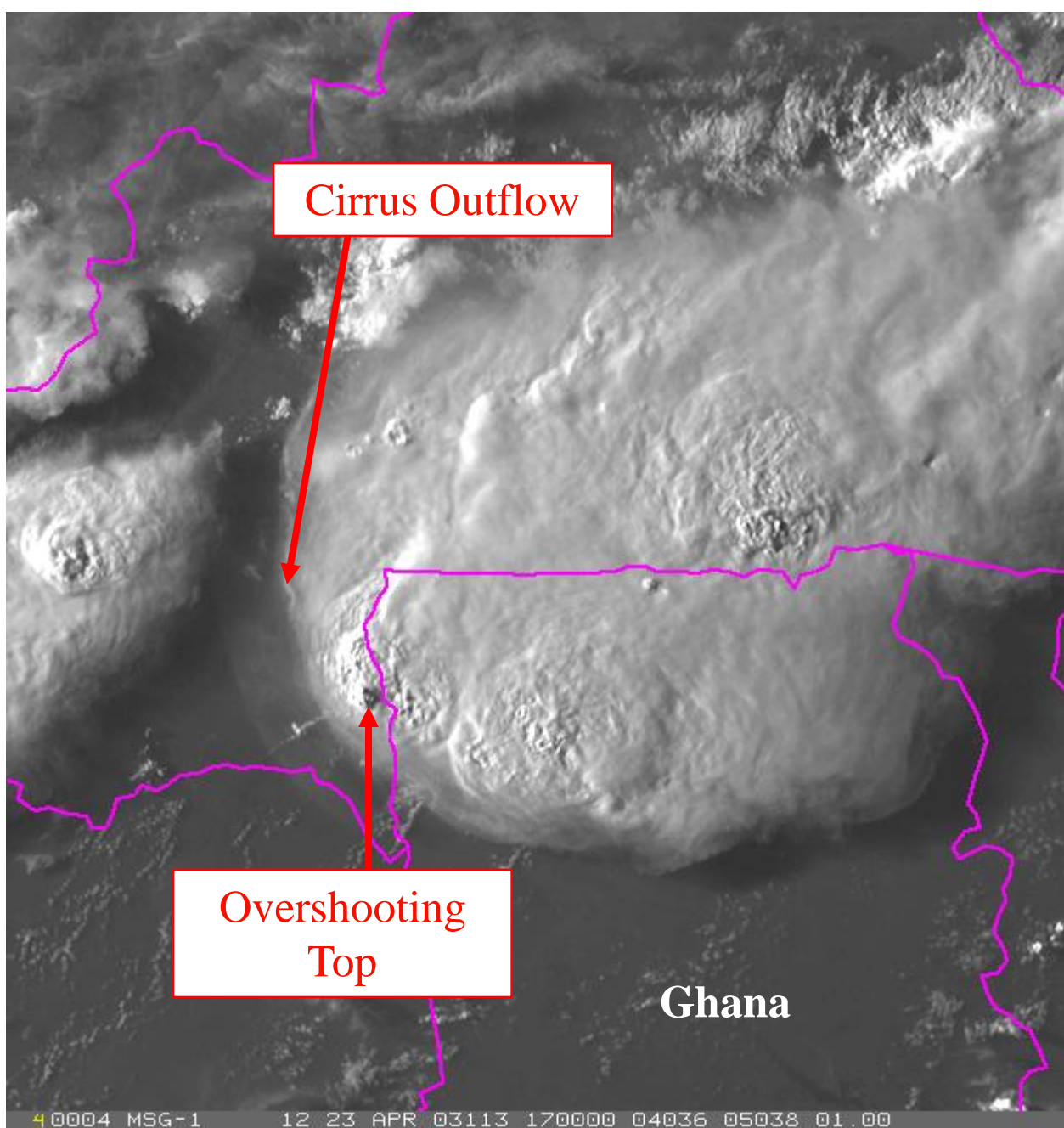
**MSG HRV**

**MONITORING OF**

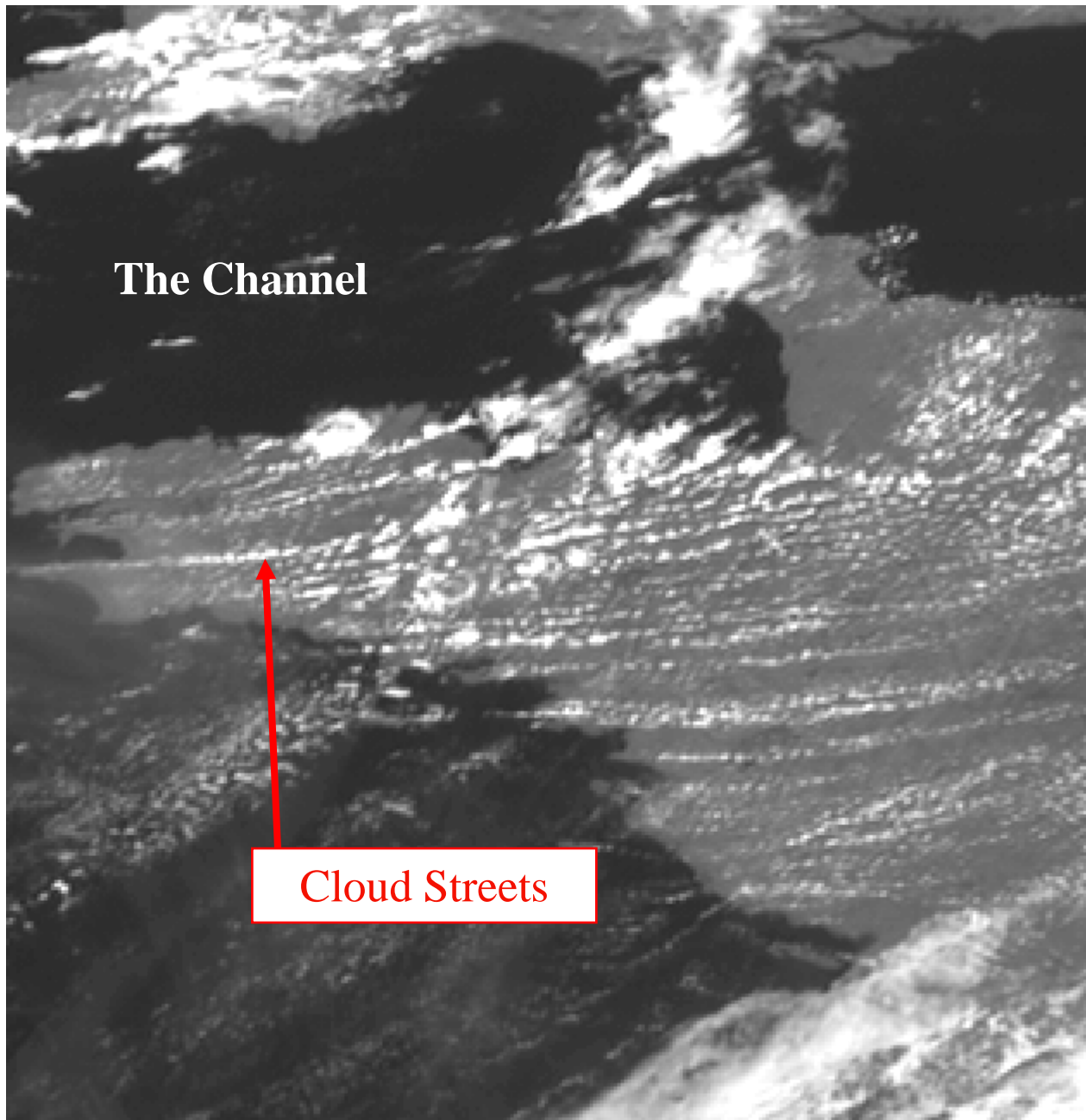
**FINE-SCALE STRUCTURES**



# Monitoring of Fine-Scale Structures with the HRV Channel



MSG-1  
23 April 2003  
17:00 UTC  
Channel 12  
(HRV)



The Channel

Cloud Streets

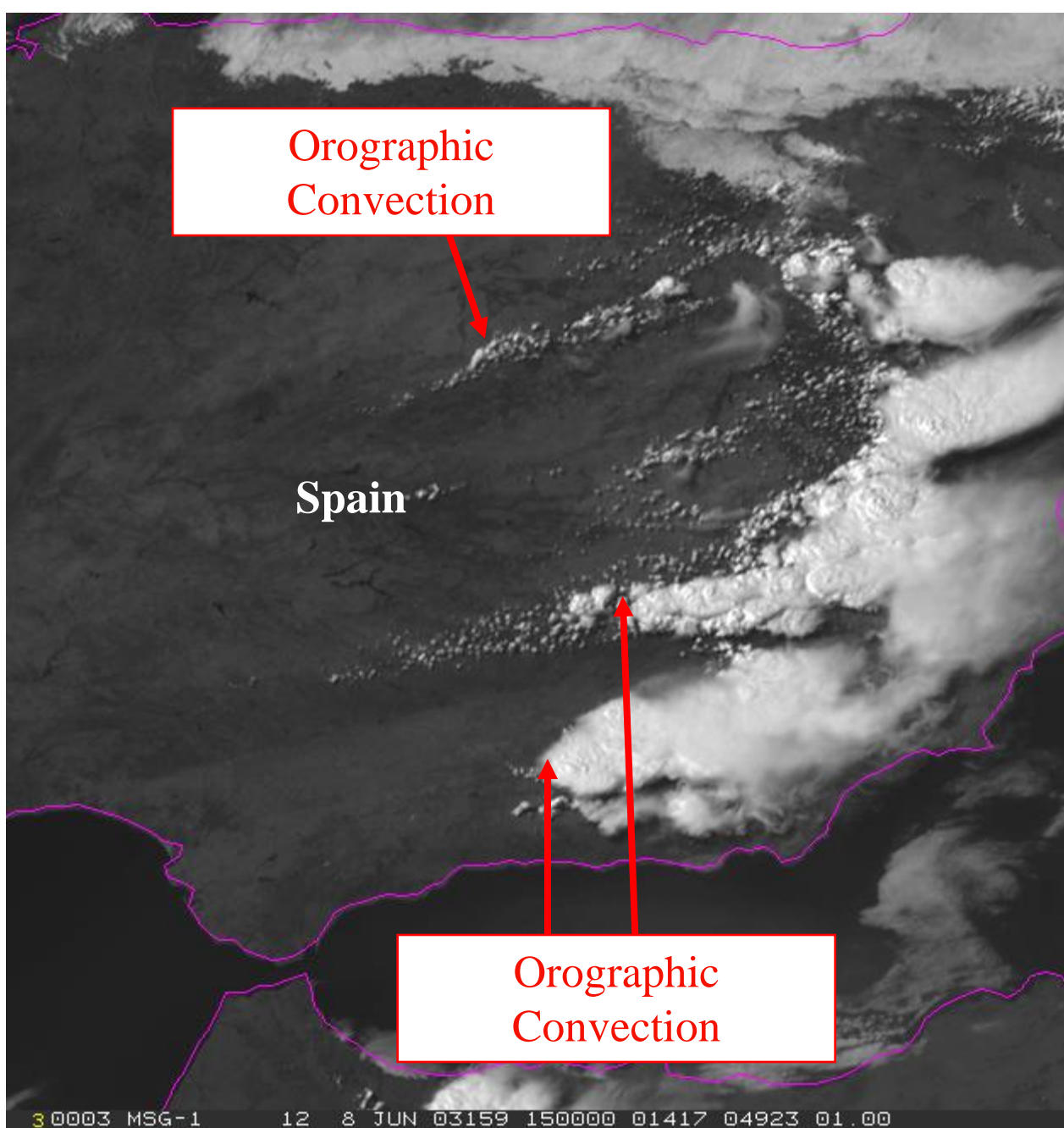
# Monitoring of Fine-Scale Structures with the HRV Channel

MSG-1  
8 June 2003  
13:00 UTC  
Channel 12  
(HRV)

3 0003 MSG-1 12 8 JUN 03159 130000 00974 05236 00.50



# Monitoring of Fine-Scale Structures with the HRV Channel



MSG-1  
8 June 2003  
15:00 UTC  
Channel 12  
(HRV)

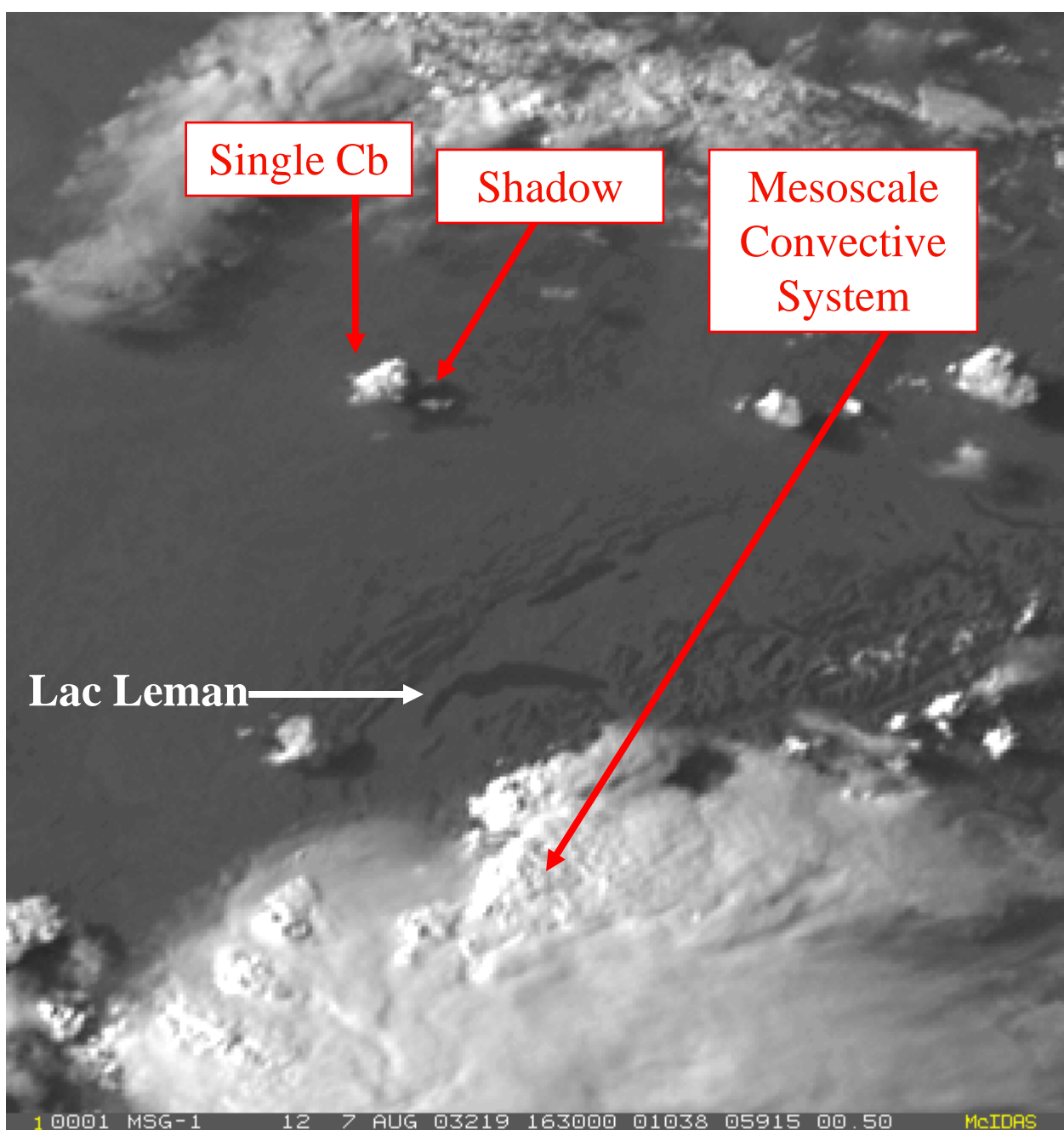
3 0003 MSG-1 12 8 JUN 03159 150000 01417 04923 01.00

# Monitoring of Fine-Scale Structures with the HRV Channel



MSG-1  
5 August 2003  
16:30 UTC  
Channel 12  
(HRV)

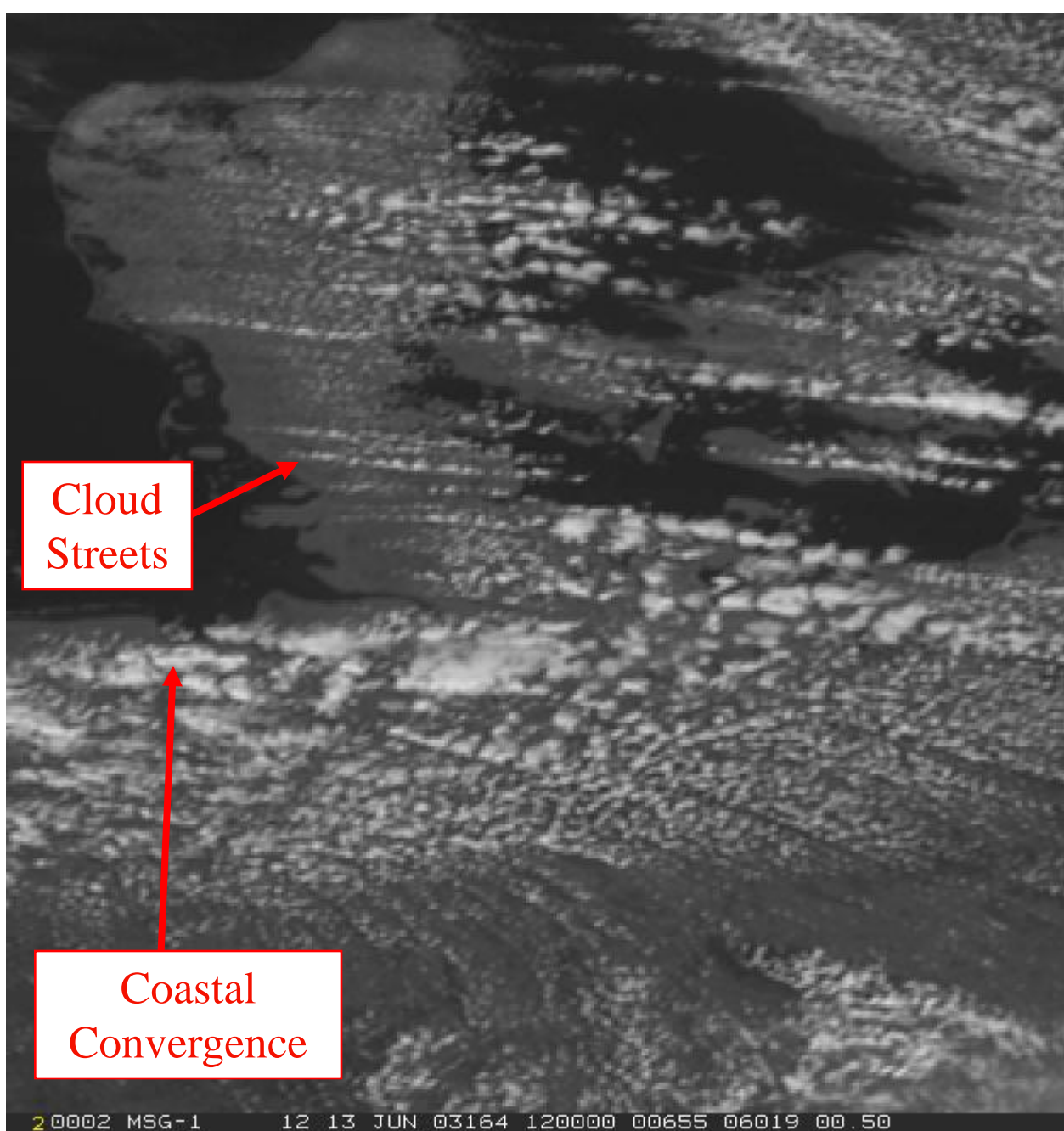
# Monitoring of Fine-Scale Structures with the HRV Channel



MSG-1  
7 August 2003  
16:30 UTC  
Channel 12  
(HRV)

1 0001 MSG-1 12 7 AUG 03219 163000 01038 05915 00.50 McIDAS

# Monitoring of Fine-Scale Structures with the HRV Channel



Cloud  
Streets

Coastal  
Convergence

MSG-1  
13 June 2003  
12:00 UTC  
Channel 12  
(HRV)

2 0002 MSG-1 12 13 JUN 03164 120000 00655 06019 00.50



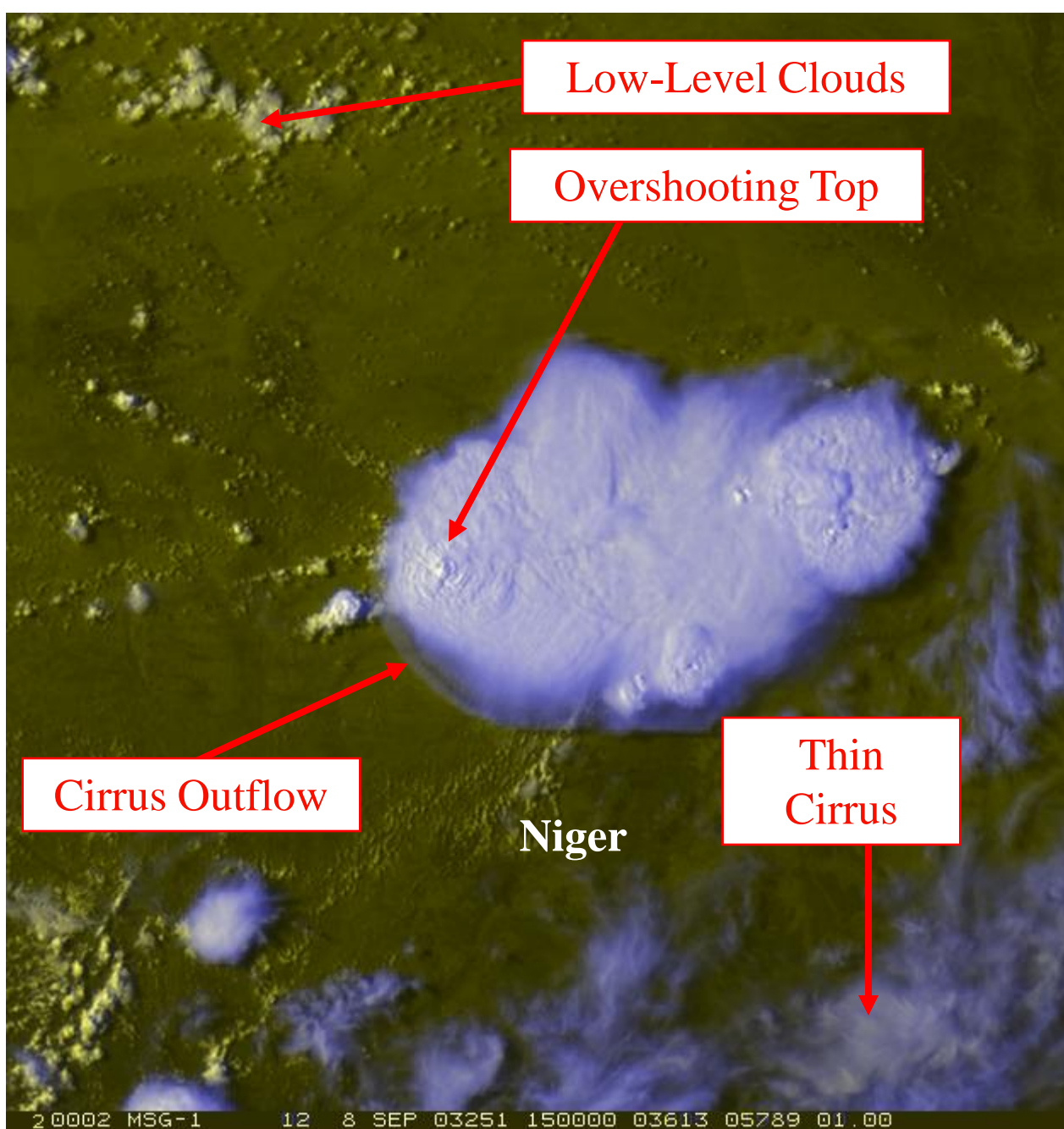
Open Bénard Cells  
in the South Atlantic Ocean

Monitoring of  
Fine-Scale  
Structures with the  
HRV Channel

1 0001 MSG-1 12 7 AUG 03219 163000 08749 04639 01.00 McIDAS

MSG-1  
7 August 2003  
16:30 UTC  
Channel 12  
(HRV)

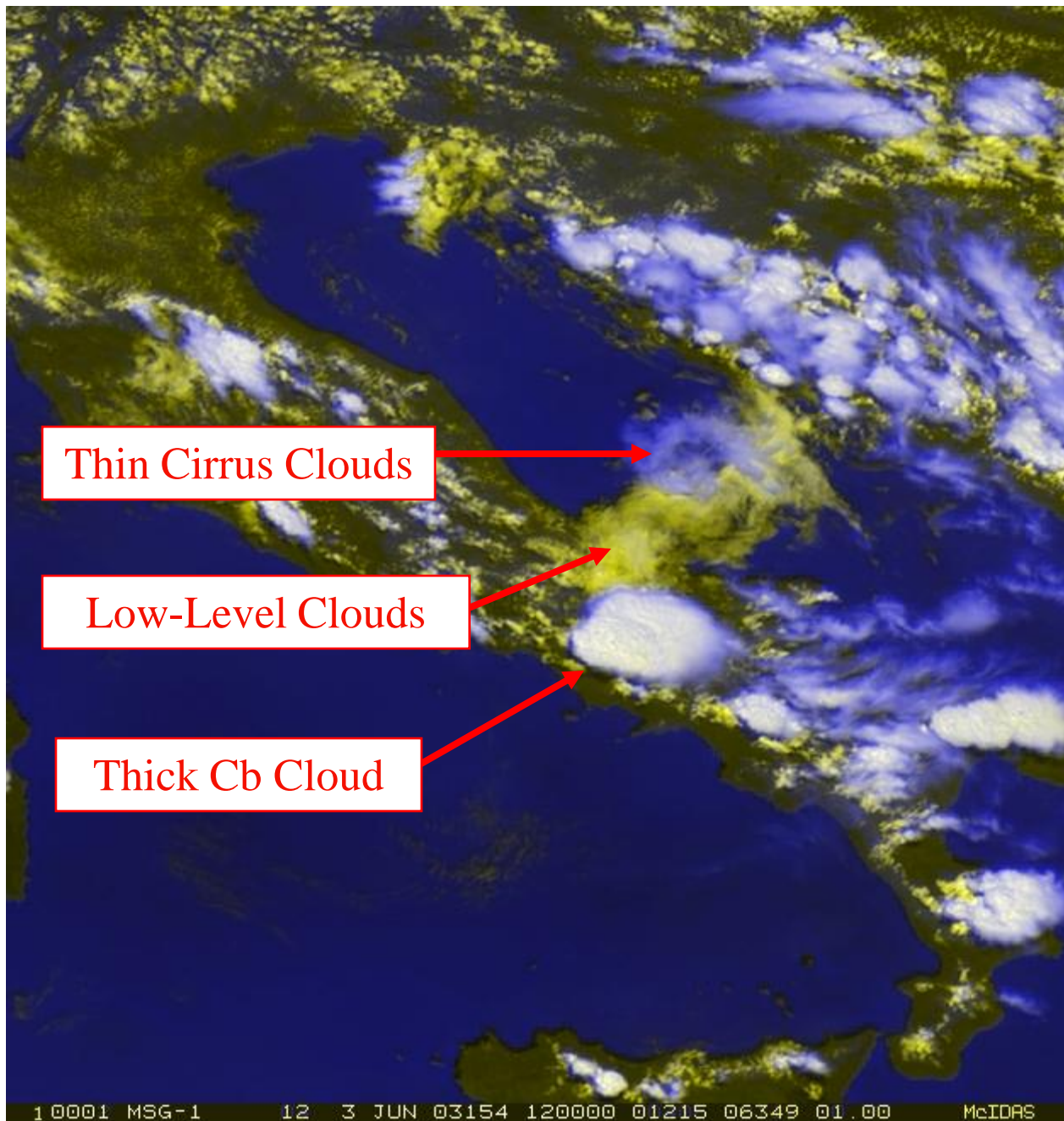
# Monitoring of Fine-Scale Structures with the HRV Channel



MSG-1  
8 September 2003  
15:00 UTC  
RGB Composite  
R = HRV  
G = HRV  
B = IR10.8i

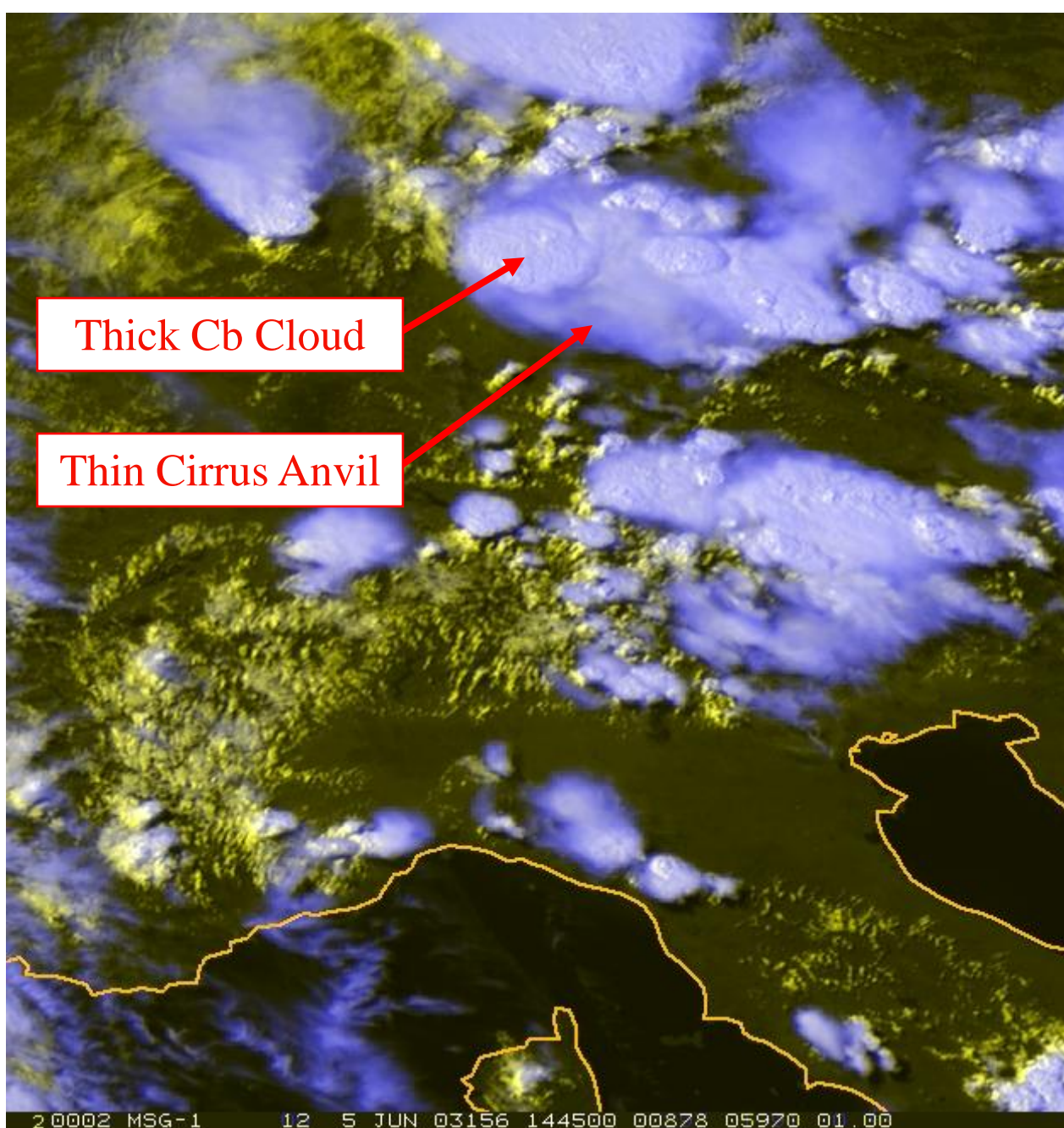


# Monitoring of Fine-Scale Structures with the HRV Channel



MSG-1  
3 June 2003  
12:00 UTC  
RGB Composite  
R = HRV  
G = HRV  
B = IR3.9i

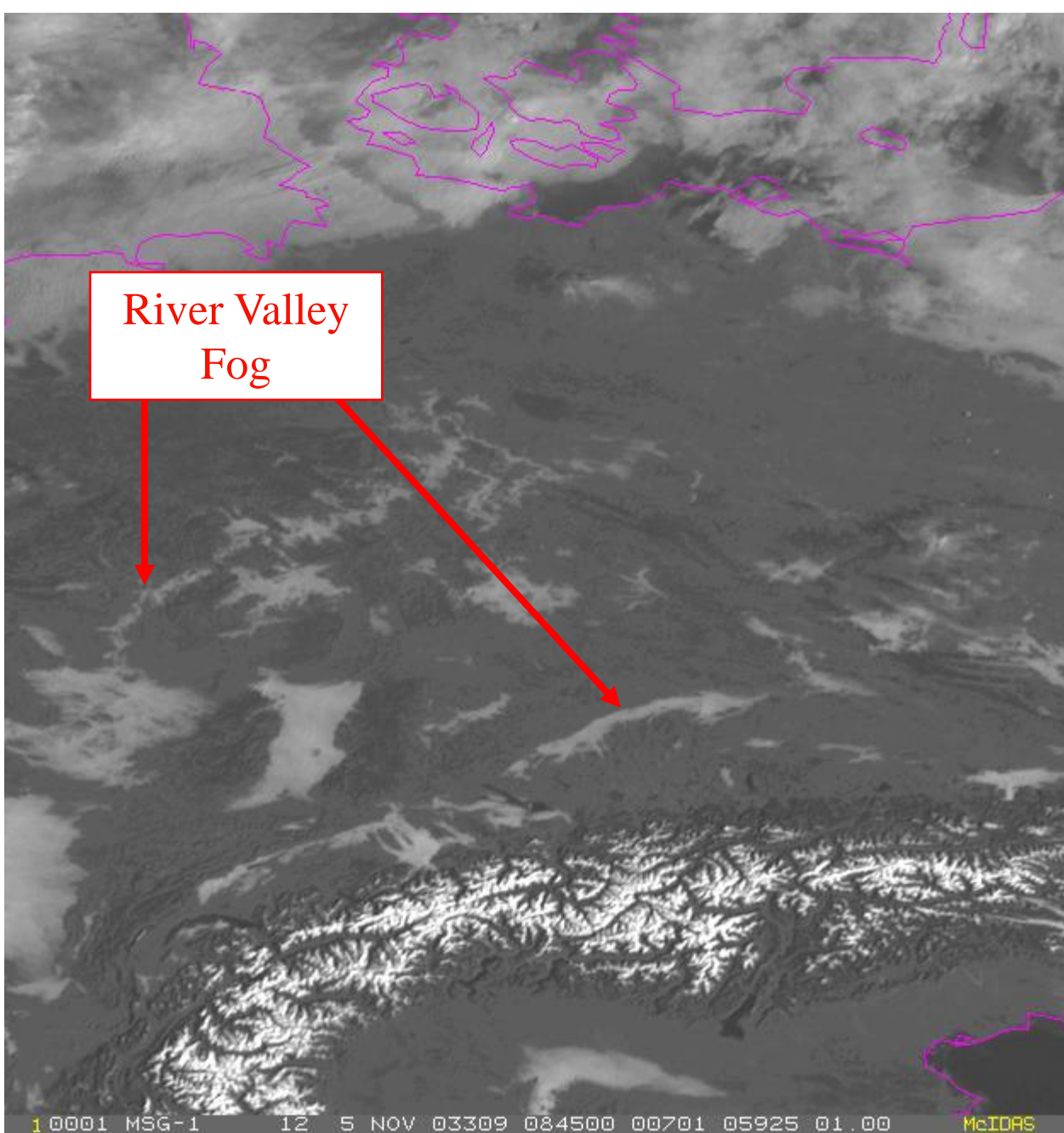
# Monitoring of Fine-Scale Structures with the HRV Channel



MSG-1  
5 June 2003  
14:45 UTC  
RGB Composite  
R = HRV  
G = HRV  
B = IR10.8i



# Monitoring of Fine-Scale Structures with the HRV Channel



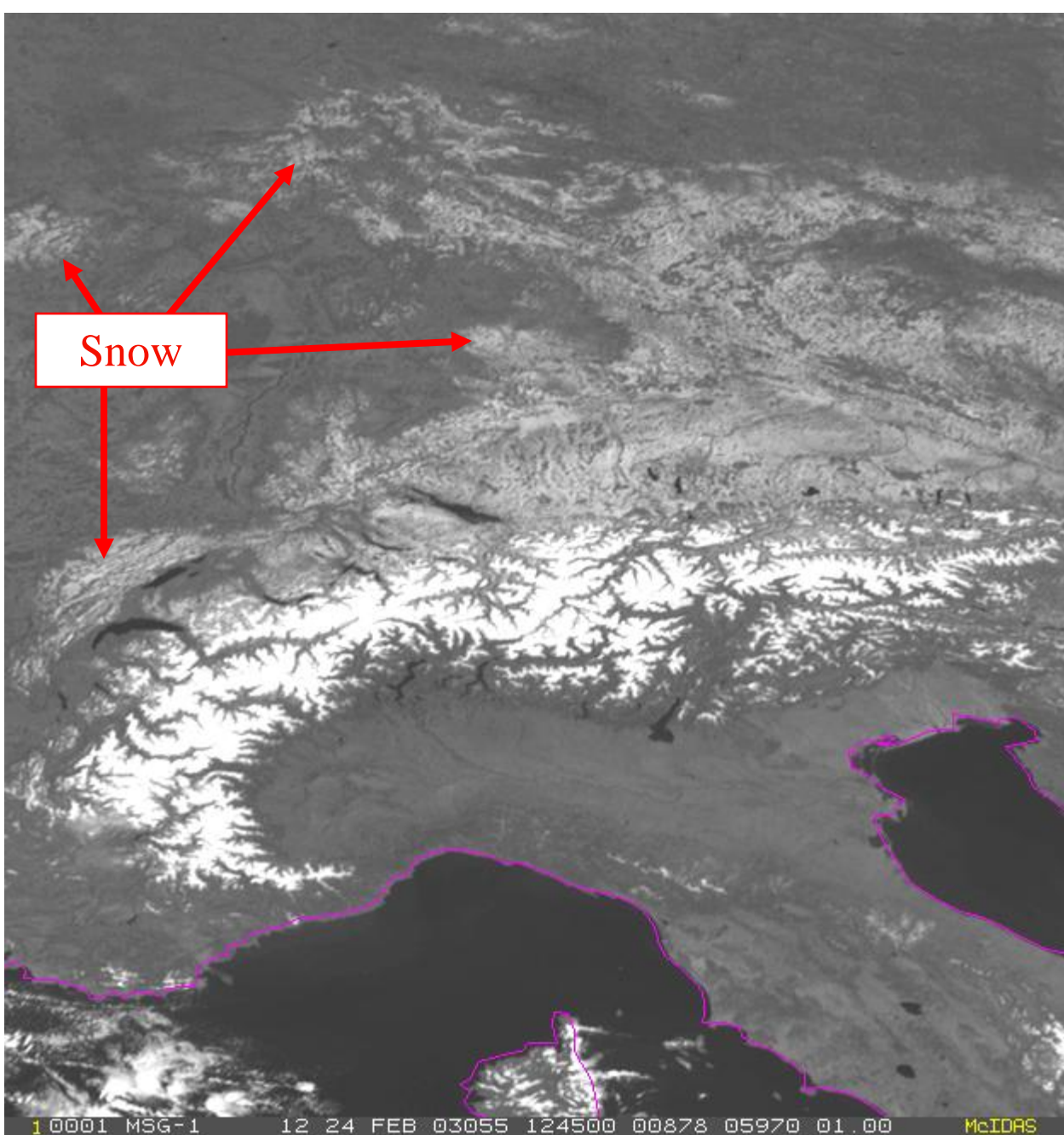
MSG-1  
5 November 2003  
08:45 UTC  
Channel 12  
(HRV)

# Monitoring of Fine-Scale Structures with the HRV Channel

Po Valley Fog

MSG-1  
20 Nov 2003  
11:30 UTC  
Channel 12  
(HRV)

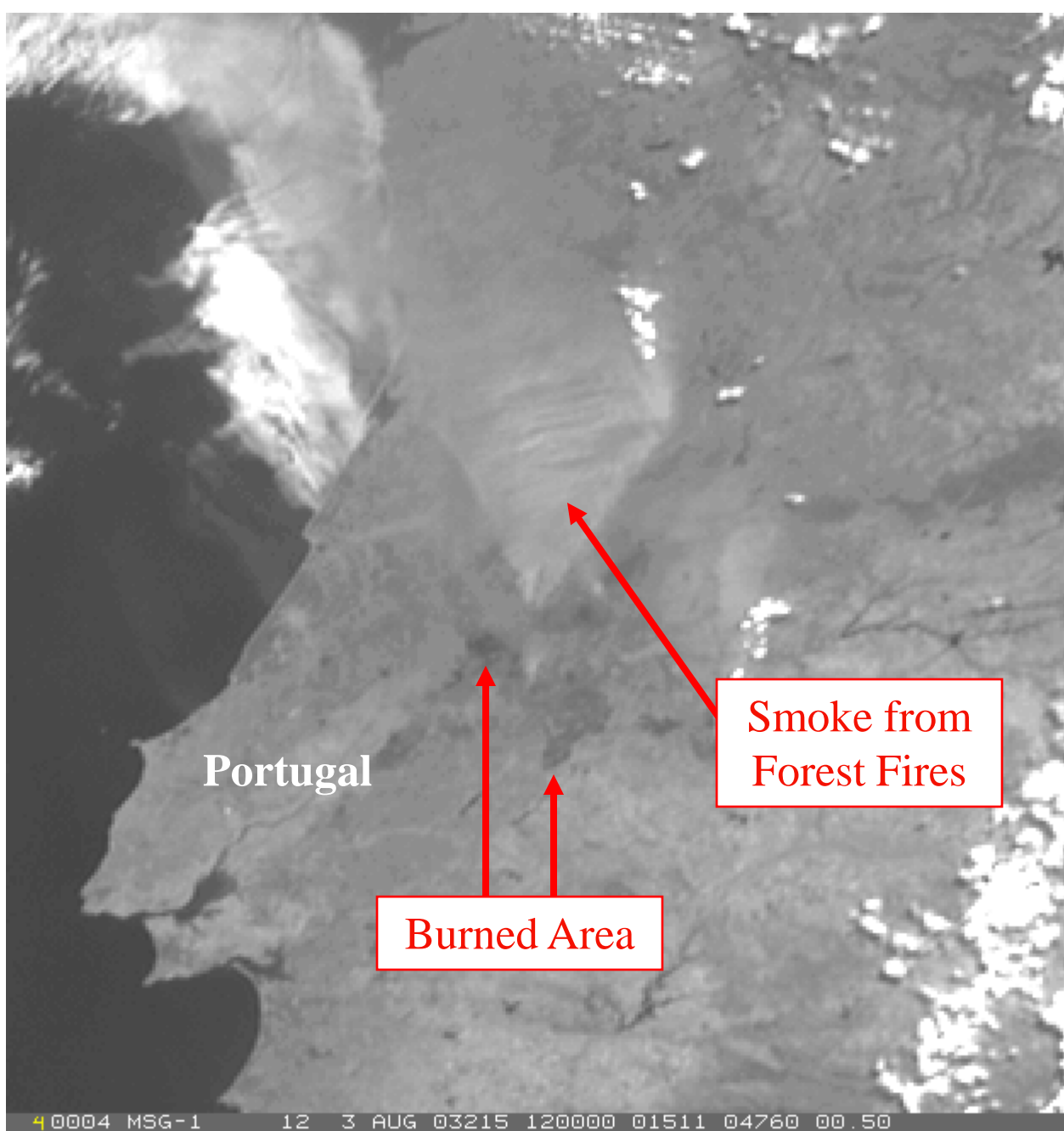
# Monitoring of Fine-Scale Structures with the HRV Channel



MSG-1  
24 February 2003  
12:45 UTC  
Channel 12  
(HRV)

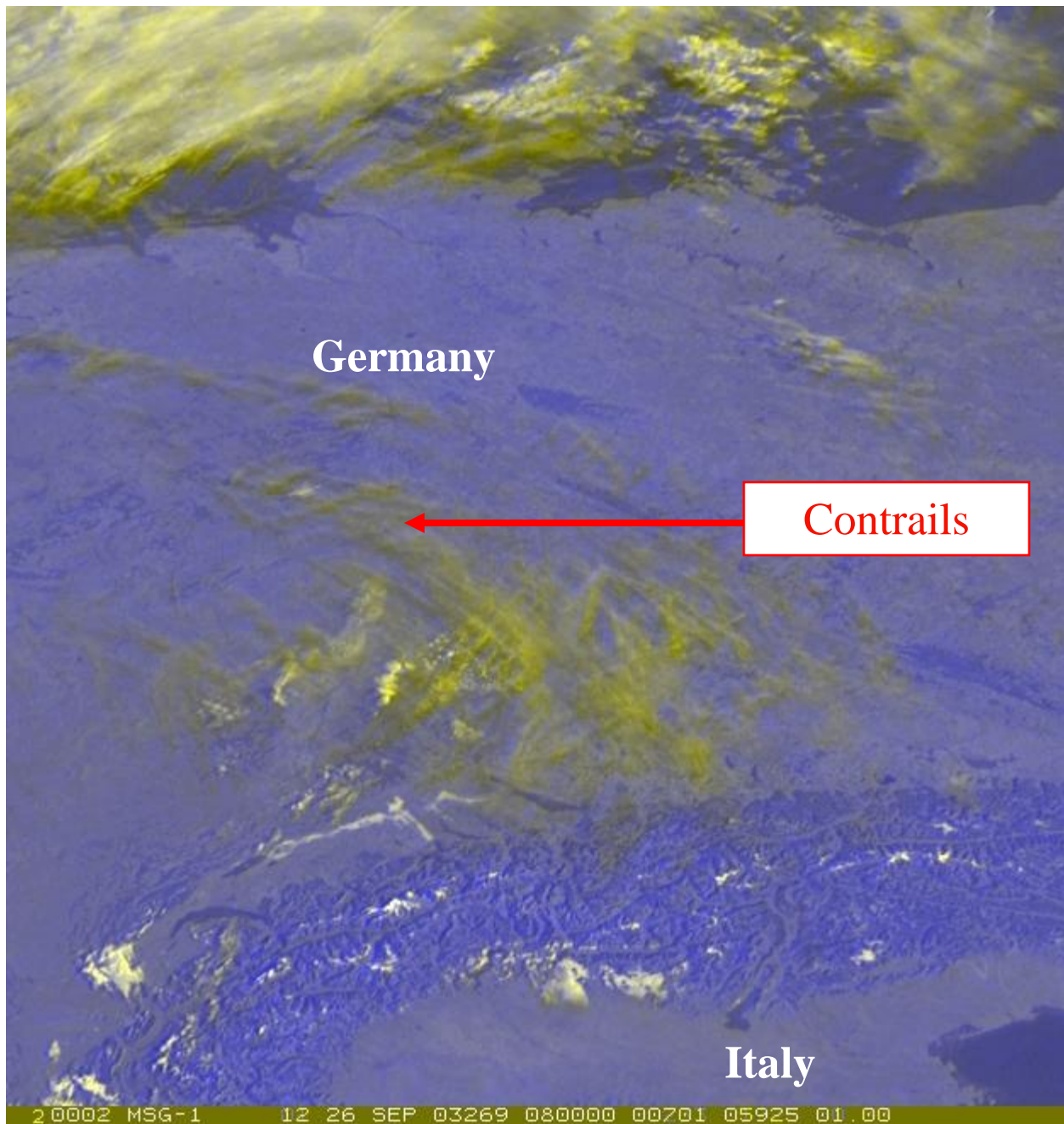


# Monitoring of Fine-Scale Structures with the HRV Channel



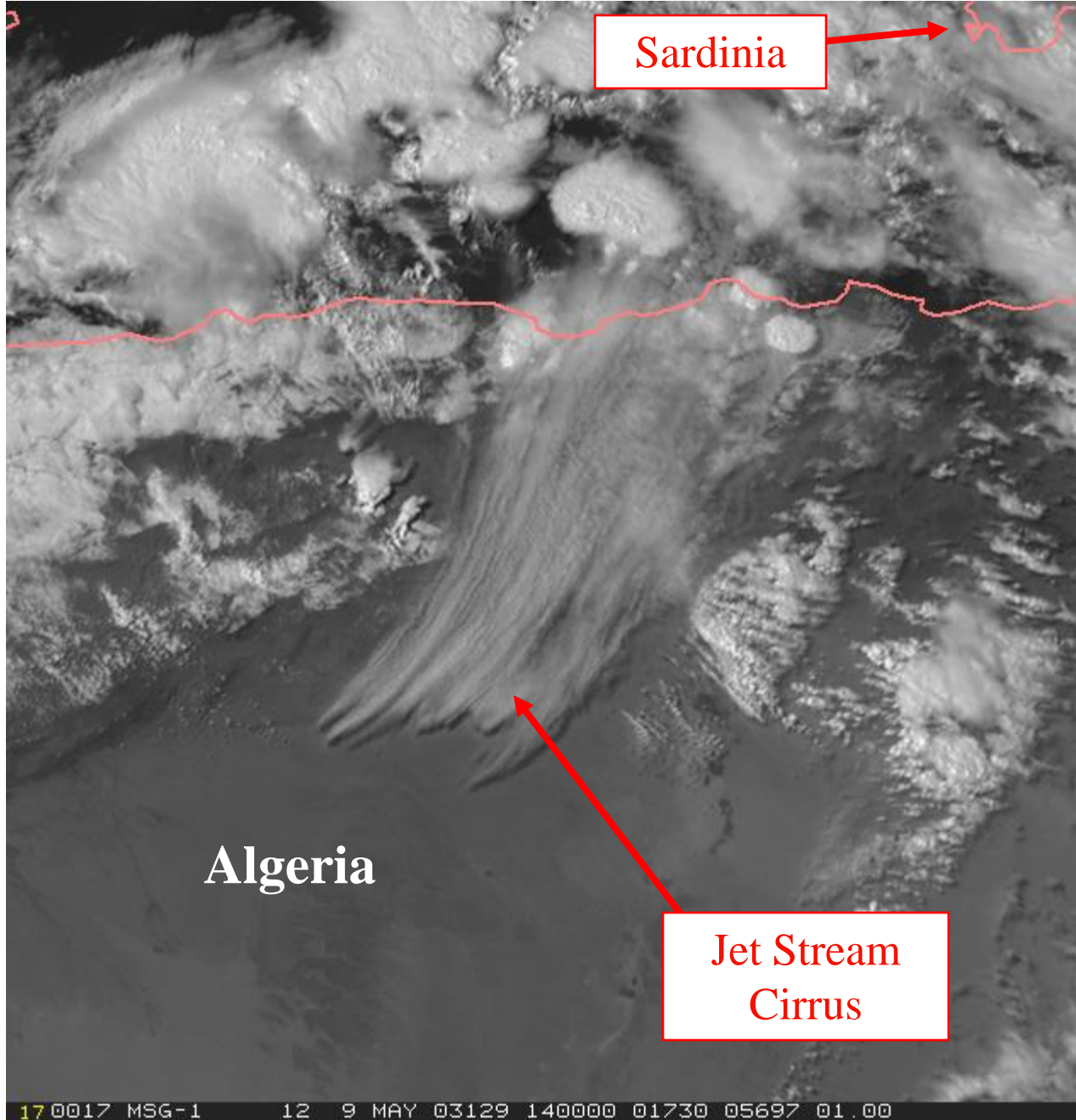
MSG-1  
3 August 2003  
12:00 UTC  
Channel 12  
(HRV)

# Monitoring of Fine-Scale Structures with the HRV Channel



MSG-1  
26 September 2003  
08:00 UTC  
RGB Composite  
R = HRV  
G = HRV  
B = IR12.0-IR10.8

20002 MSG-1 12 26 SEP 03269 080000 00701 05925 01.00



Monitoring of  
Fine-Scale  
Structures with the  
HRV Channel

MSG-1  
9 May 2003  
14:00 UTC  
Channel 12  
(HRV)

17 0017 MSG-1 12 9 MAY 03129 140000 01730 05697 01.00



Red  
Sea

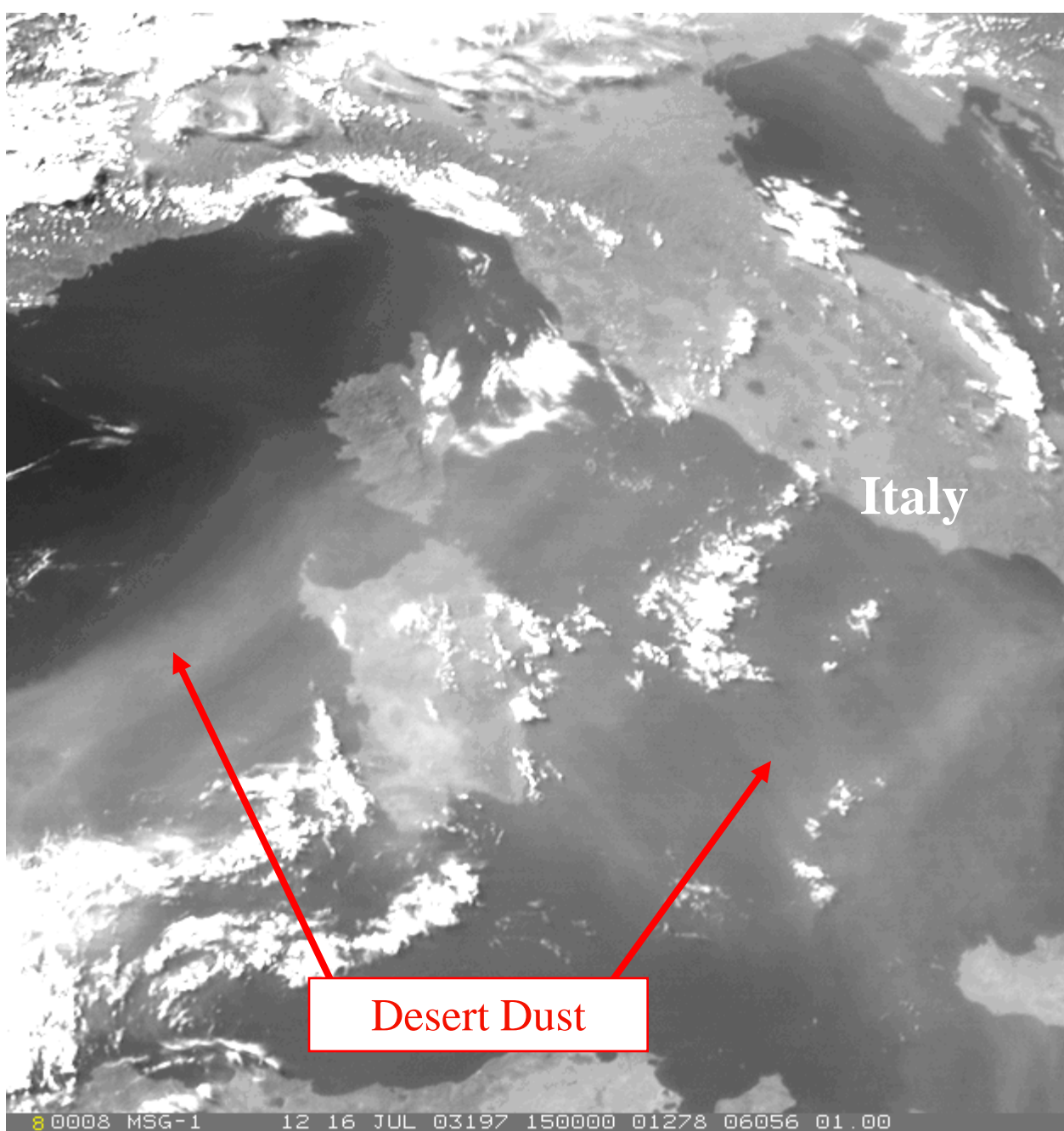
## Monitoring of Fine-Scale Structures with the HRV Channel

Dust Storm

MSG-1  
25 June 2003  
10:00 UTC  
Channel 12  
(HRV)

2 0002 MSG-1 12 25 JUN 03176 100000 03301 10501 01.00

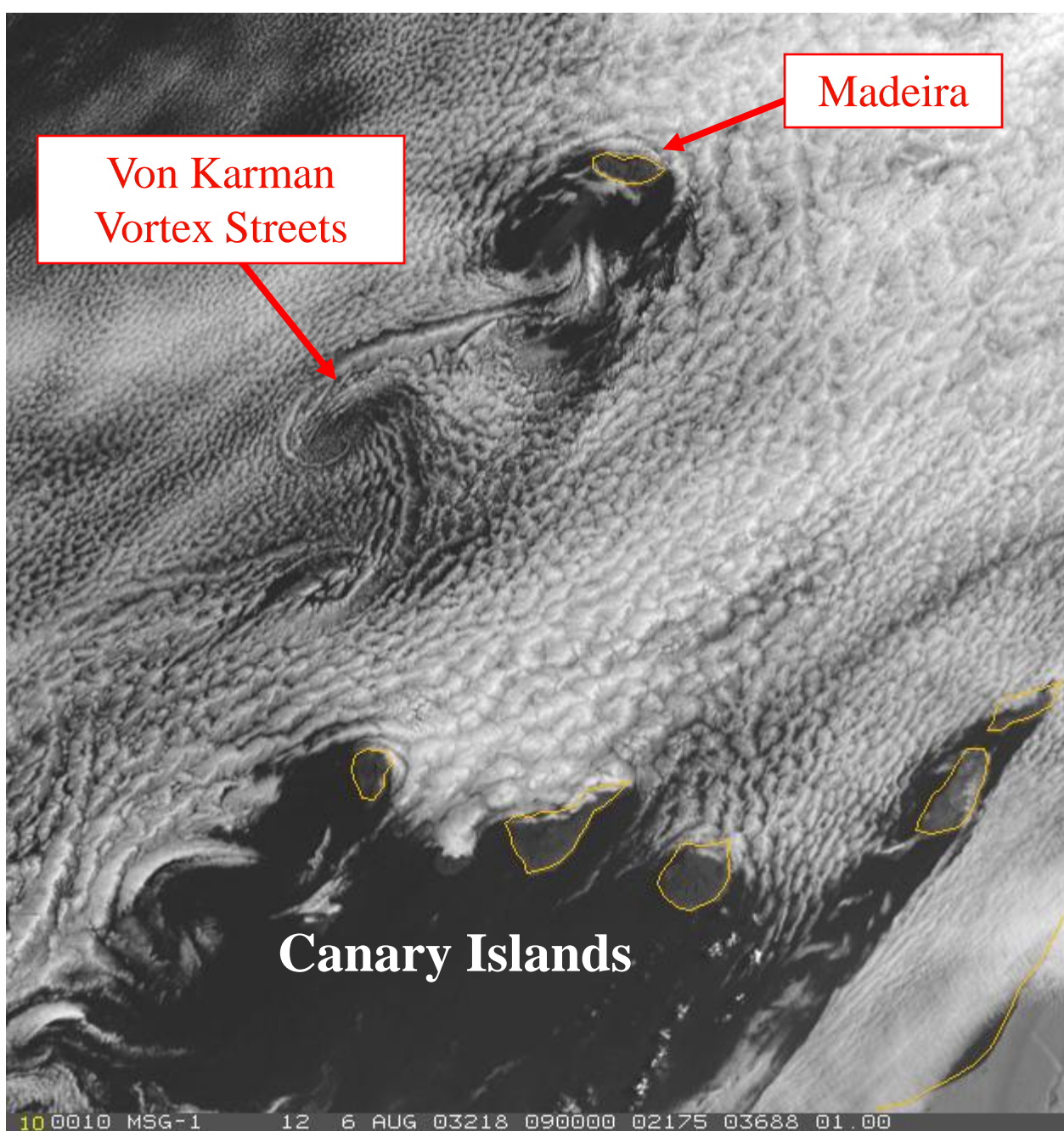
# Monitoring of Fine-Scale Structures with the HRV Channel



MSG-1  
16 July 2003  
15:00 UTC  
Channels 12  
(HRV)

8 0008 MSG-1 12 16 JUL 03197 150000 01278 06056 01.00



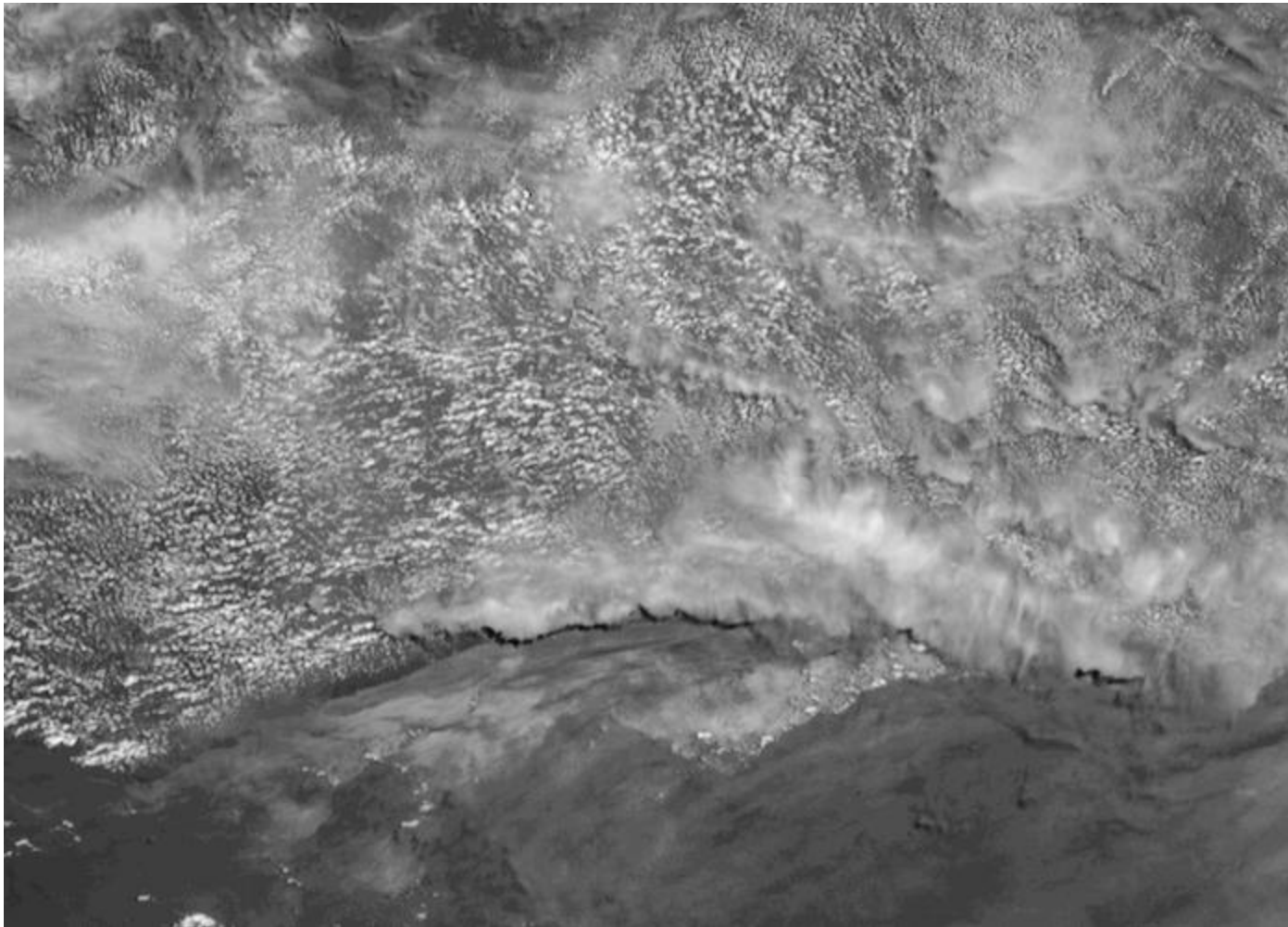


## Monitoring of Fine-Scale Structures with the HRV Channel

MSG-1  
6 August 2003  
09:00 UTC  
Channel 12  
(HRV)

# PART 7:

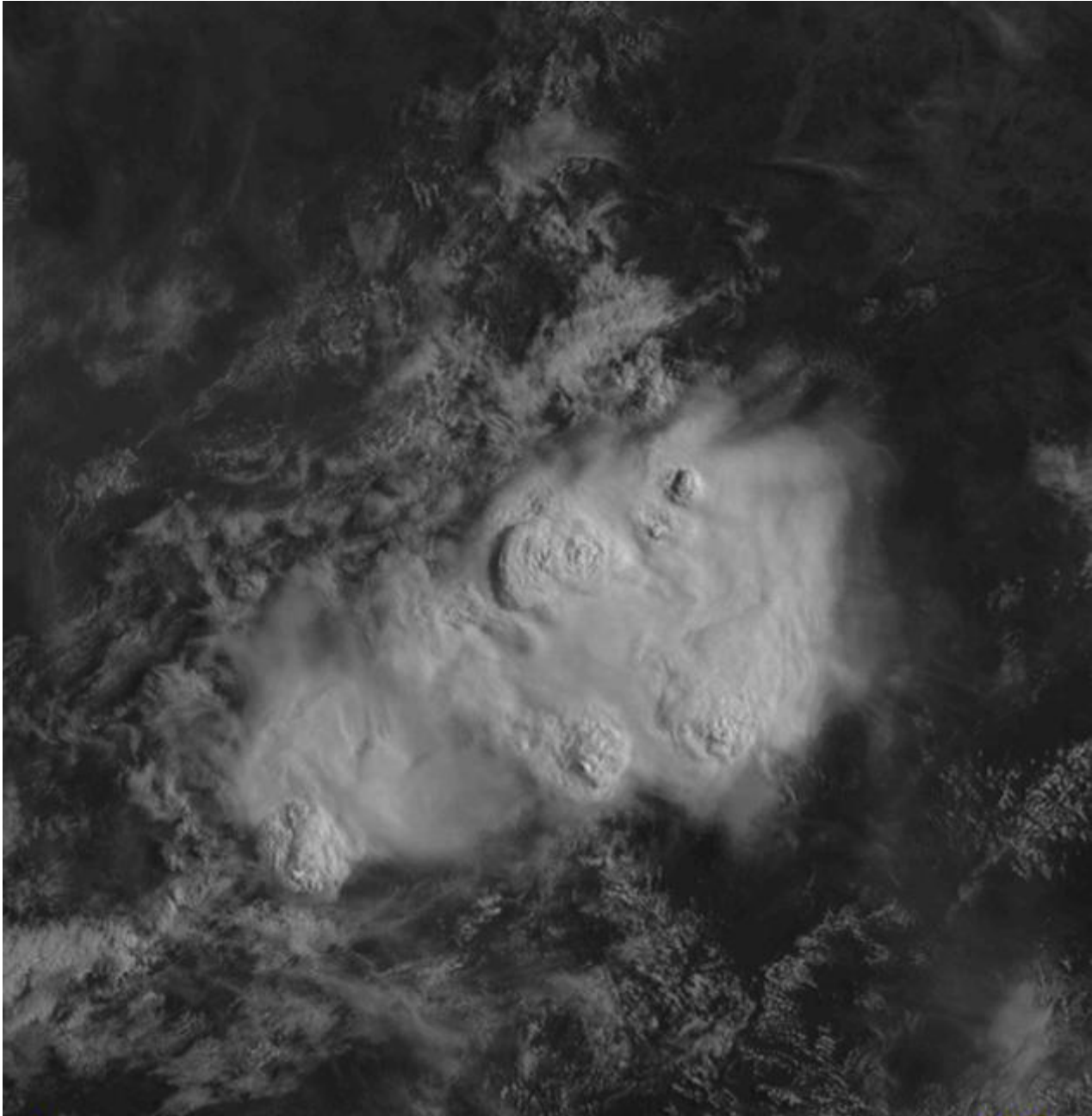
# MSG HRV LOOPS



**Click on the icon  
to see the  
animation  
(AVI, 8948 KB) !**



MSG-1 HRV Image, 24 April 2003, Ivory Coast



**Click on the icon to see the animation (08:00-09:30 UTC, AVI, 2434 KB) !**

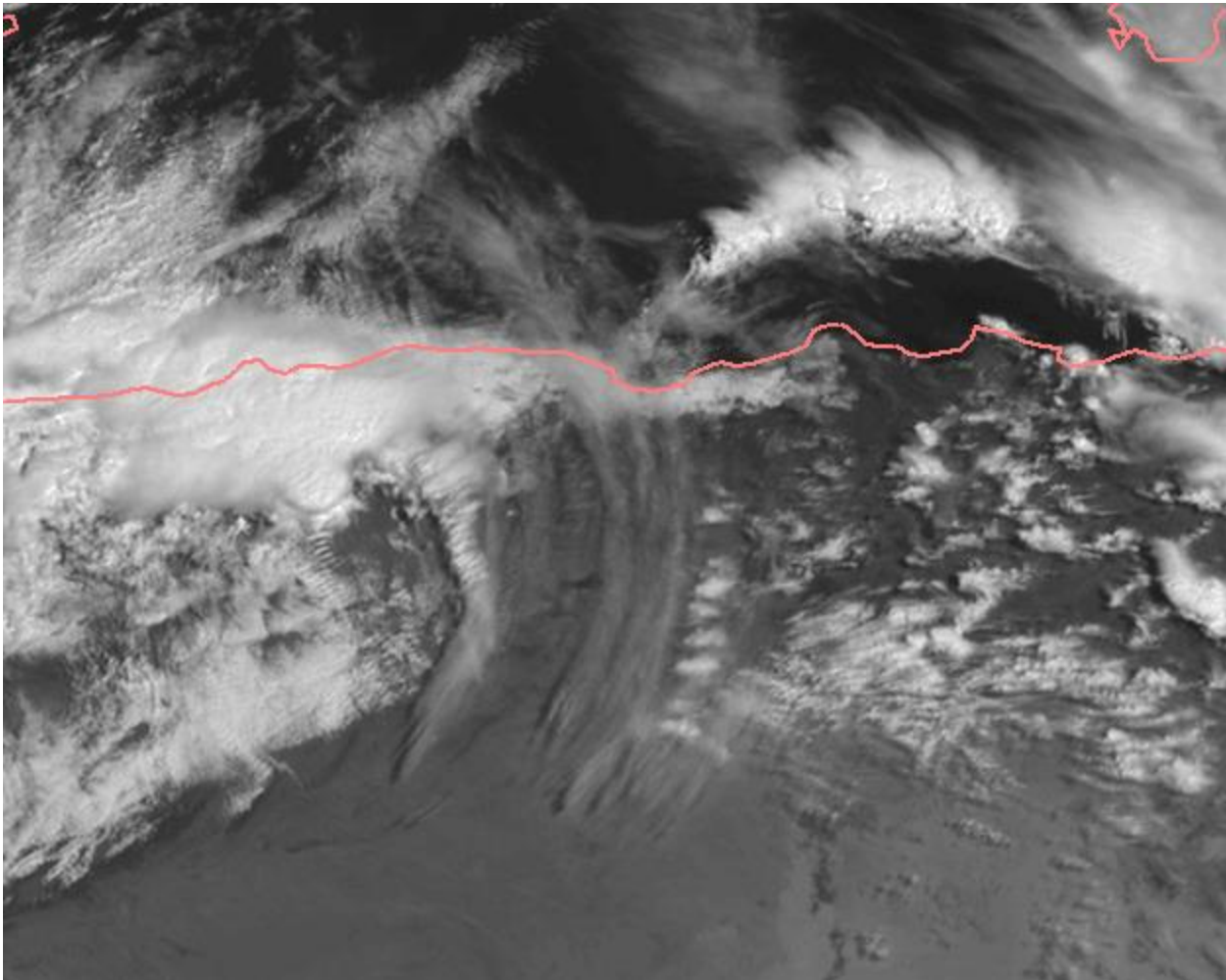


**Cb clouds** over Nigeria as seen in the high-res. visible channel

MSG-1  
24 April 2003  
08:00 UTC  
Channel 12  
(HRV)

1 0001 MSG-1 12 24 APR 03114 080000 04363 06239 01.00 McIDAS





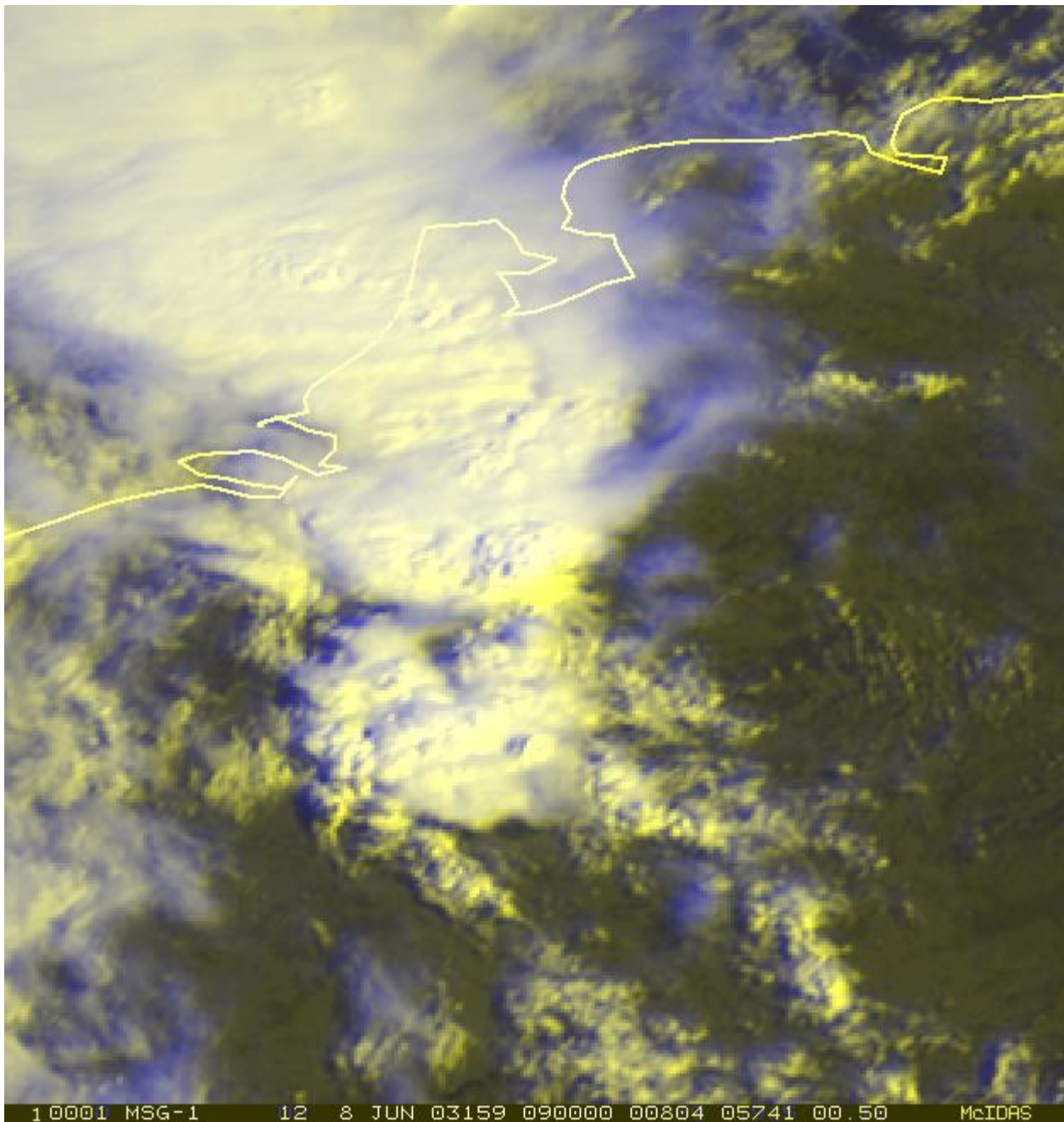
**Click on the icon to  
see the animation  
(10:00-14:45 UTC,  
AVI, 5588 KB) !**



MSG-1  
9 May 2003  
10:00 UTC  
Channel 12  
(HRV)

**Cirrus clouds** over Algeria as seen in the high-res. visible channel





**Click on the icon to see the animation (09:00-11:00 UTC, AVI, 10978 KB) !**



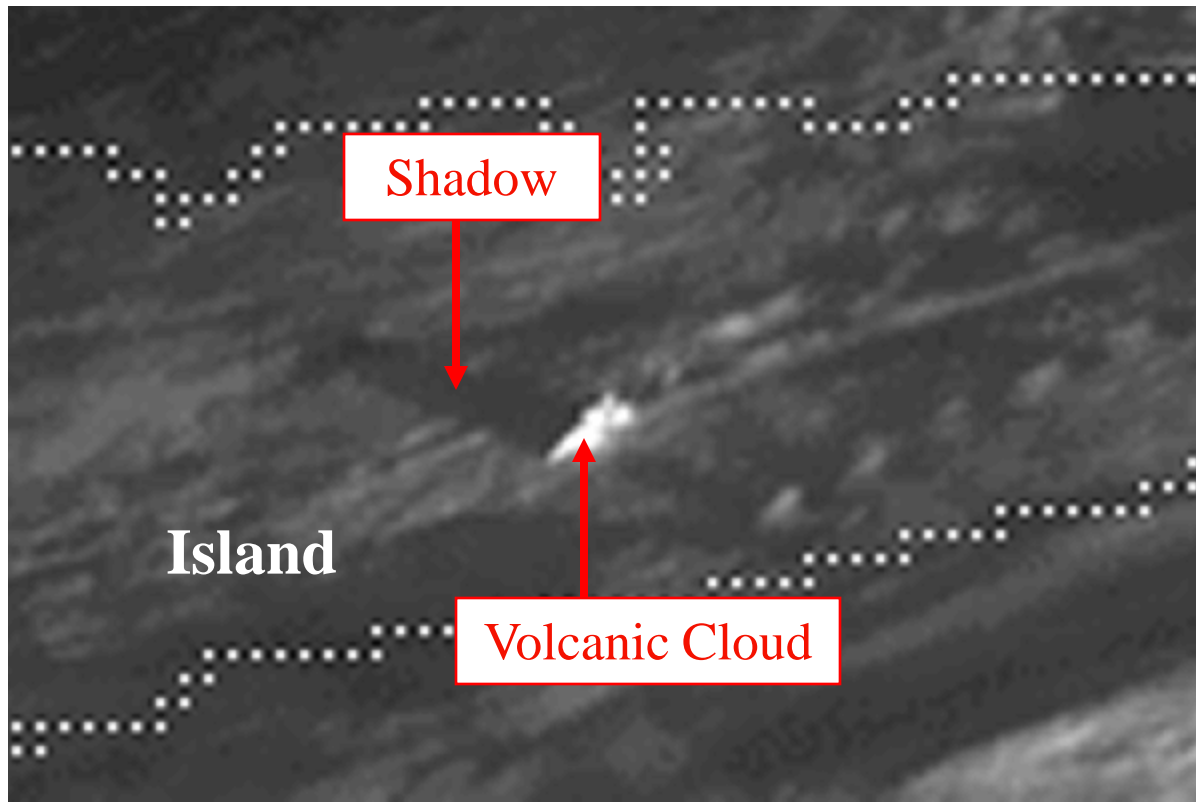
**Severe Thunderstorms with tornado** over The Netherlands

MSG-1  
8 June 2003  
09:00 UTC  
RGB Composite  
R = HRV  
G = HRV  
B = IR10.8i

10001 MSG-1 12 8 JUN 03159 090000 00804 05741 00.50 McIDAS



**Click on the icon to  
see the animation  
(08:45-14:00 UTC,  
AVI, 3619 KB) !**



**Eruption of Grimsvotn  
volcano on Island  
on 2 November 2004**

MSG-1  
2 November 2004  
09:30 UTC  
Channel 12  
(HRV)