

Dust (and Smoke) Detection with MSG SEVIRI RGB Products

Exercises

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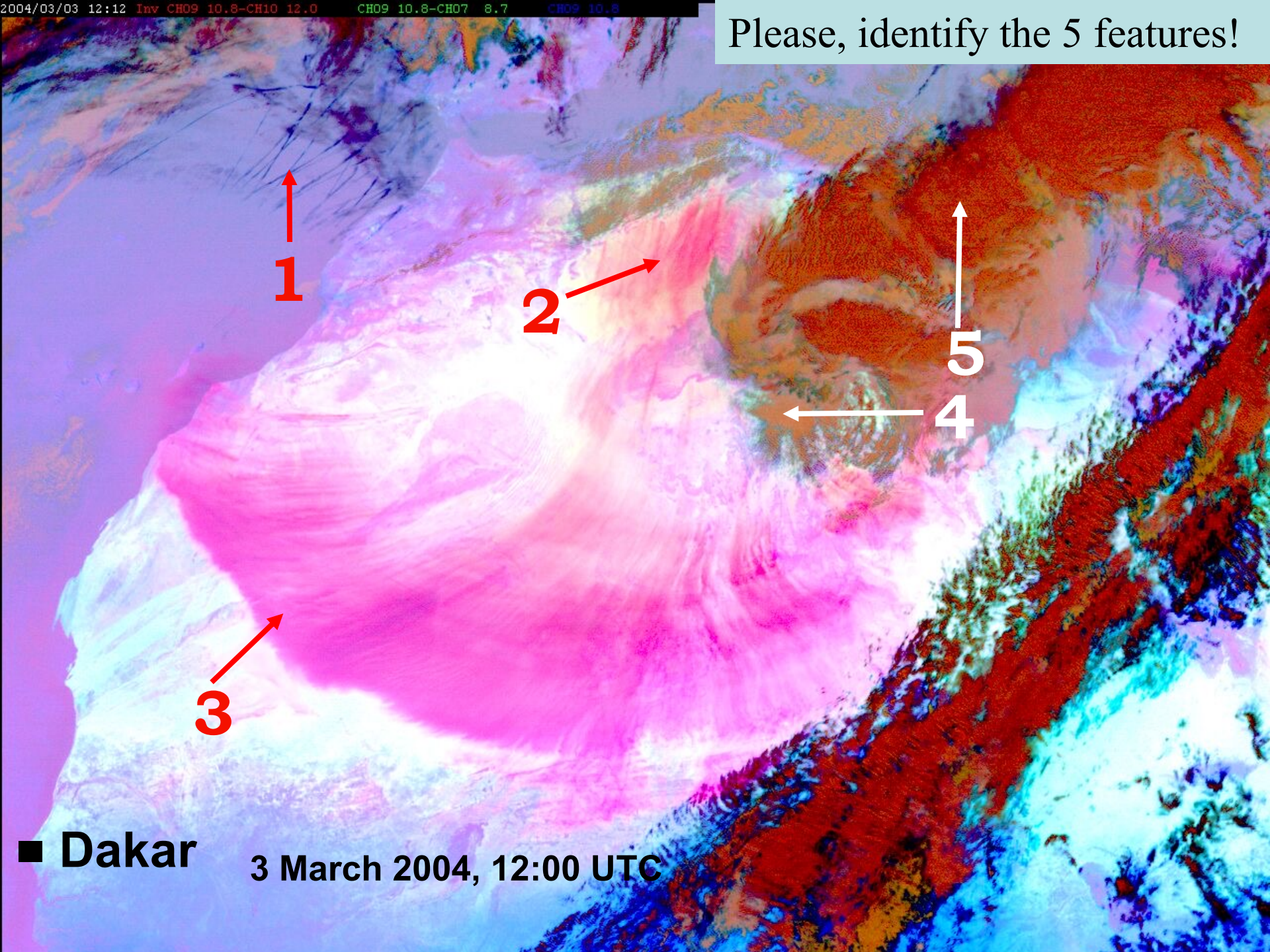
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- 1) Dust RGB Colour Exercise
- 2) General Quiz / Questions
- 3) Detection / Outline of Dust Clouds
- 4) Height Determination of Dust Clouds
- 5) Dust Nowcasting Exercise

Dust RGB
Colour Exercise
(Feature Identification)

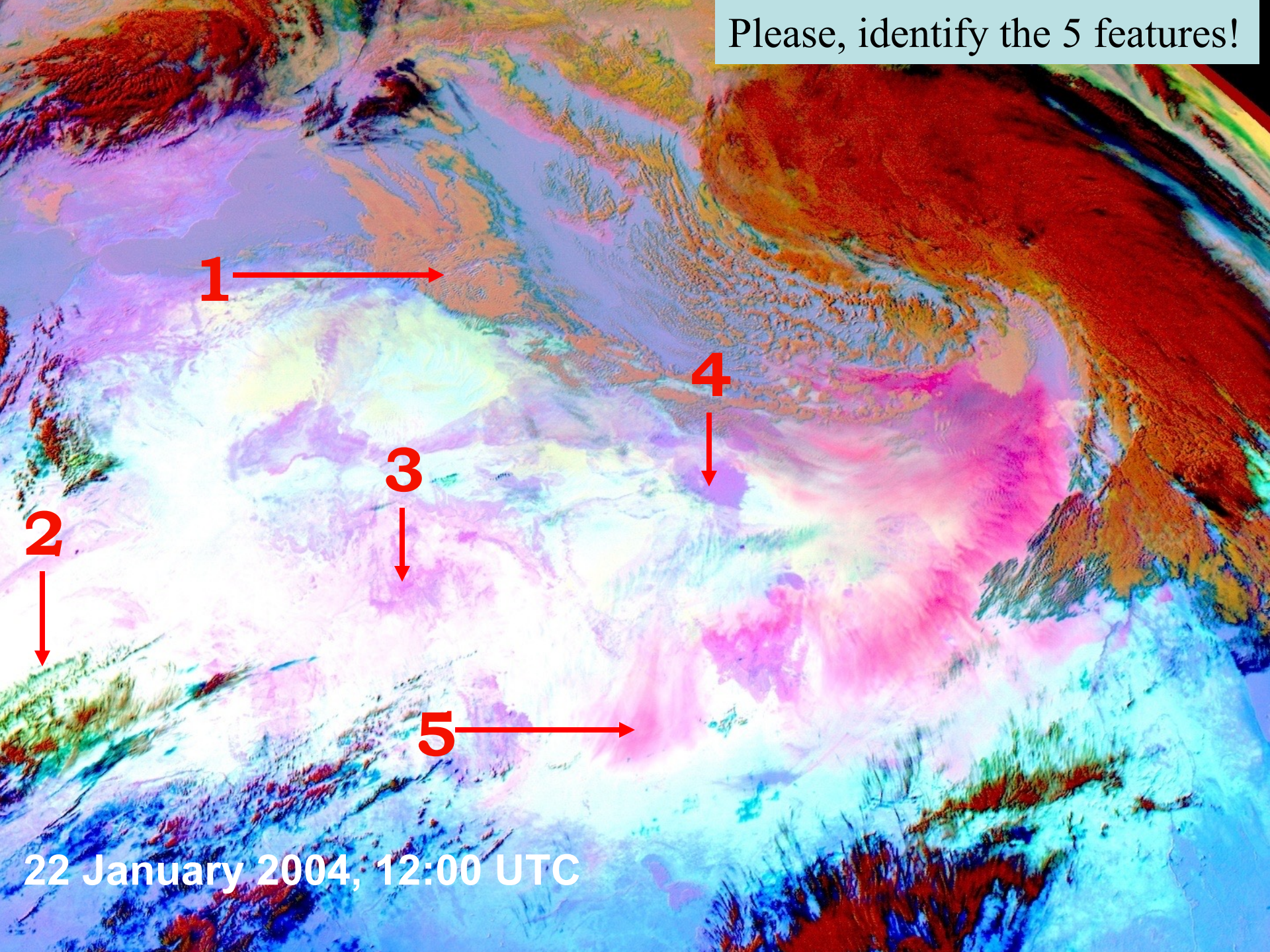
Please, identify the 5 features!



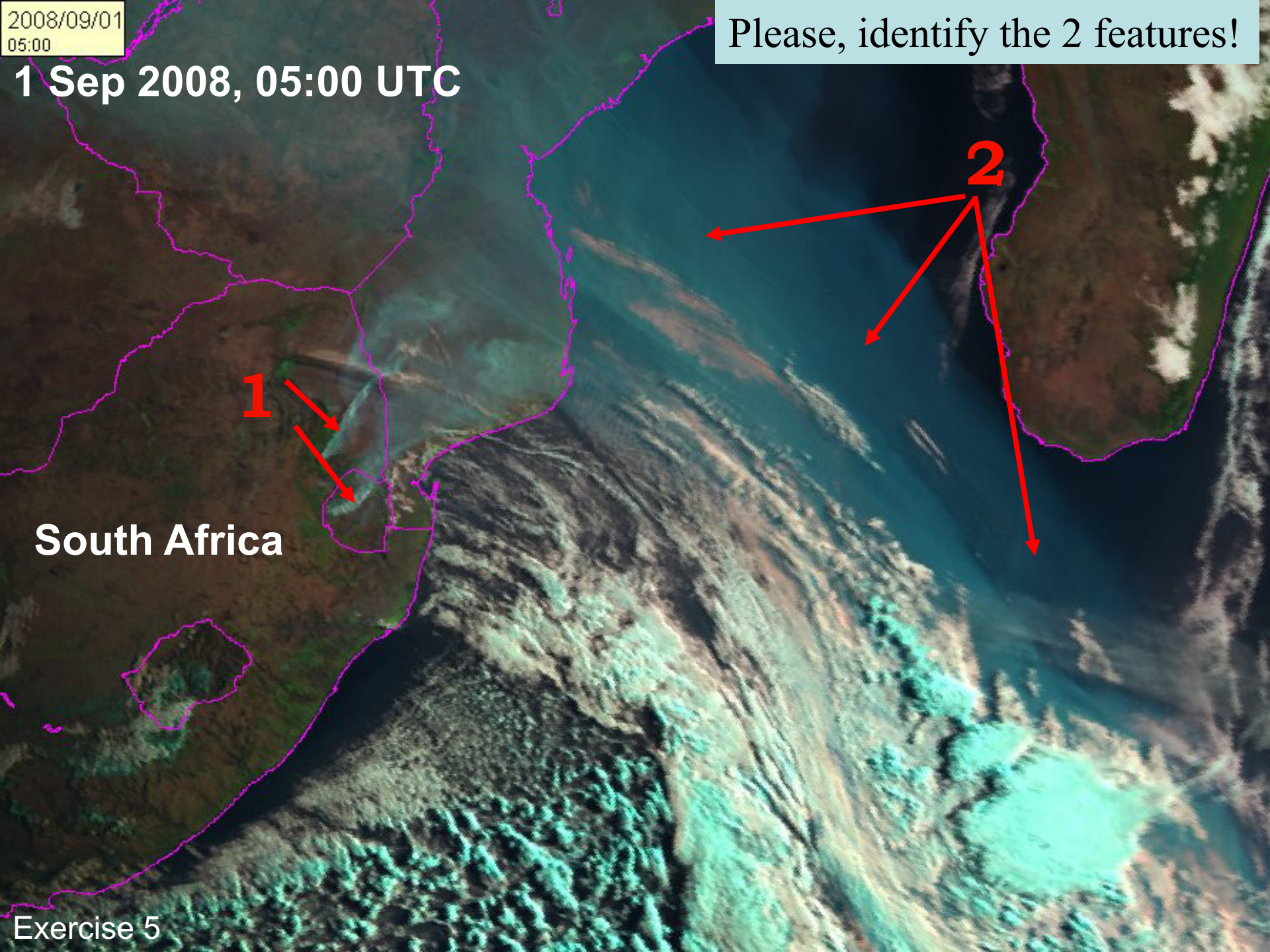
■ Dakar

3 March 2004, 12:00 UTC

Please, identify the 5 features!



22 January 2004, 12:00 UTC



2008/09/01
05:00

Please, identify the 2 features!

1 Sep 2008, 05:00 UTC

1

2

South Africa

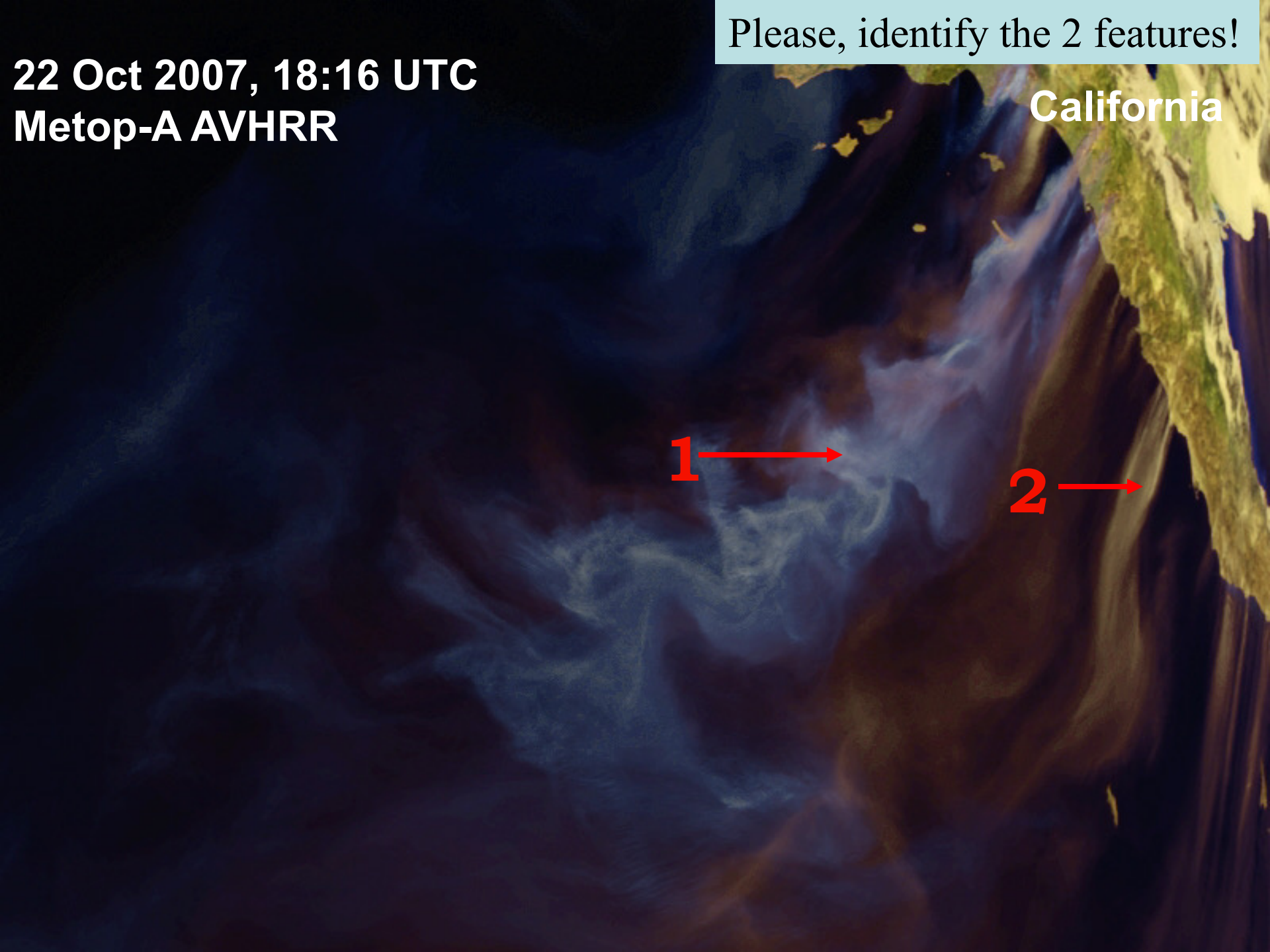
Please, identify the 2 features!

22 Oct 2007, 18:16 UTC
Metop-A AVHRR

California

1 →

2 →

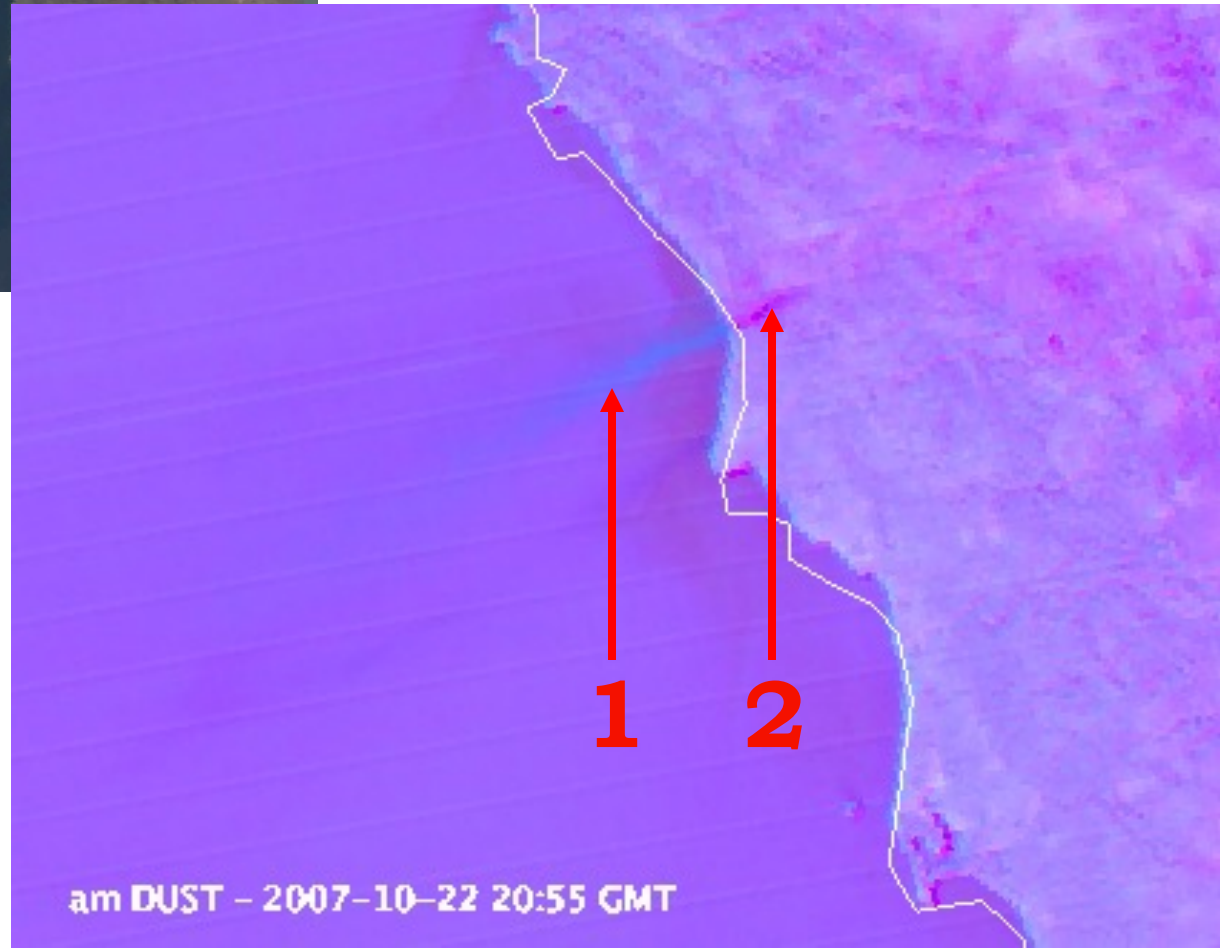


Dust



Why does the colour of the
dust plume change?

amTCOL - 2007-10-22 20:55UTC



am DUST - 2007-10-22 20:55 GMT

Please, identify the 3 features!

25 Nov 2009, 14:00 UTC



1



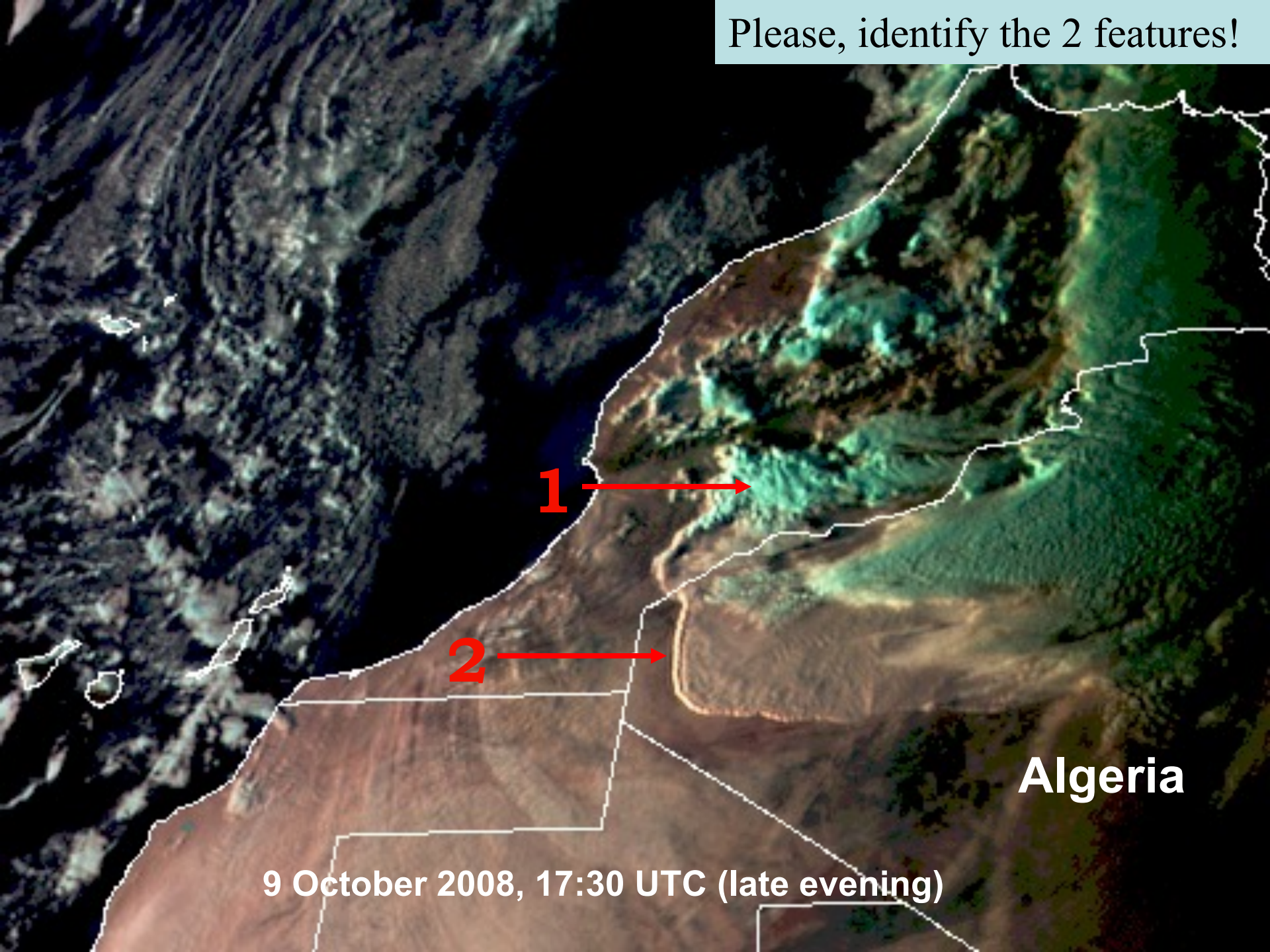
2



3

Nigeria

Please, identify the 2 features!



1

2

Algeria

9 October 2008, 17:30 UTC (late evening)

General Quiz / Questions

Synoptic-Scale Dust Outbreaks (N. Hemisphere)

Which is the main season for synoptic (frontal) dust outbreaks in Northern Africa ?

Winter (Dec-Feb)

☐

Spring (Mar-May)

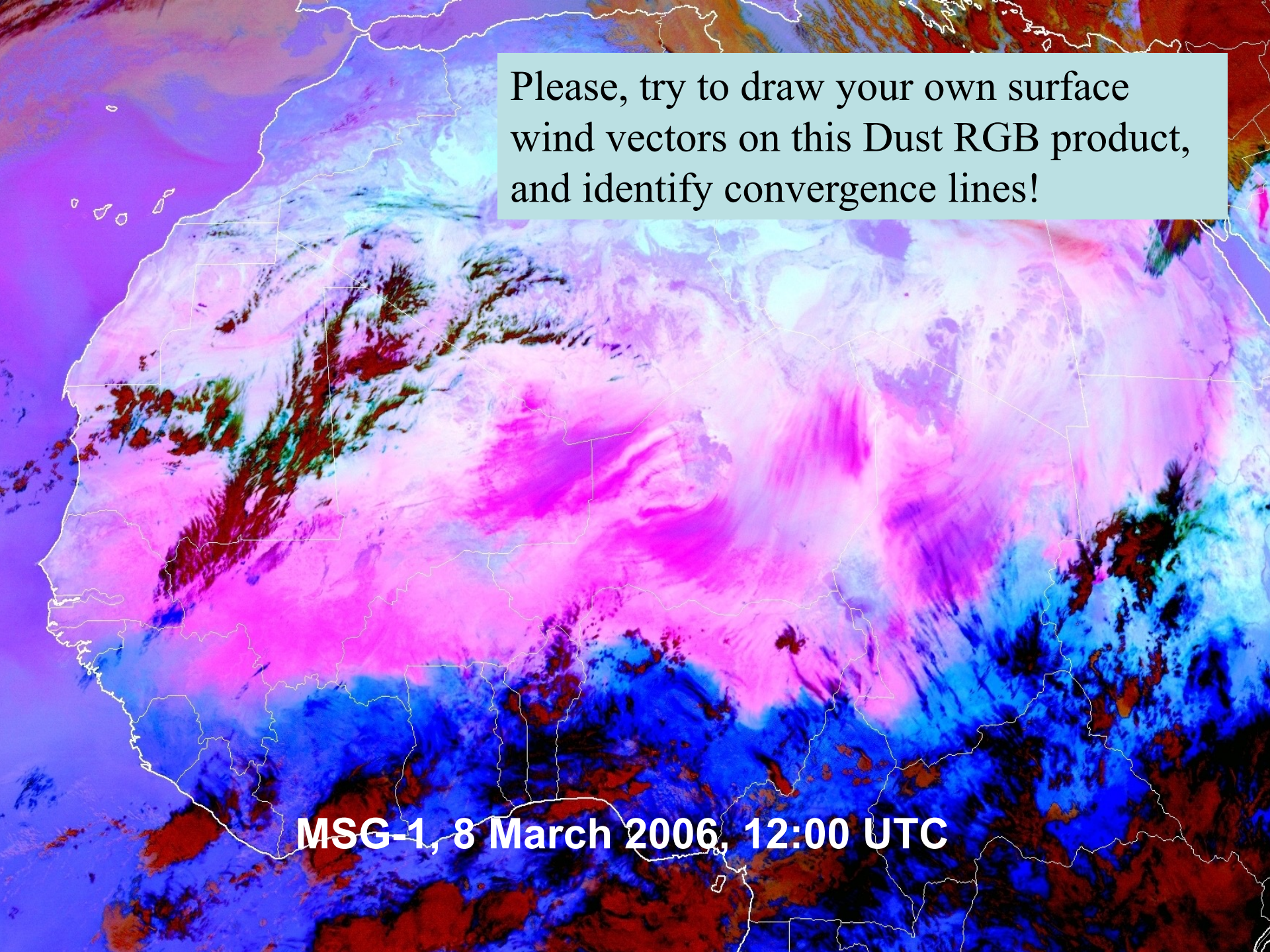
☐

Summer (Jun-Aug)

☐

Autumn (Sep-Nov)

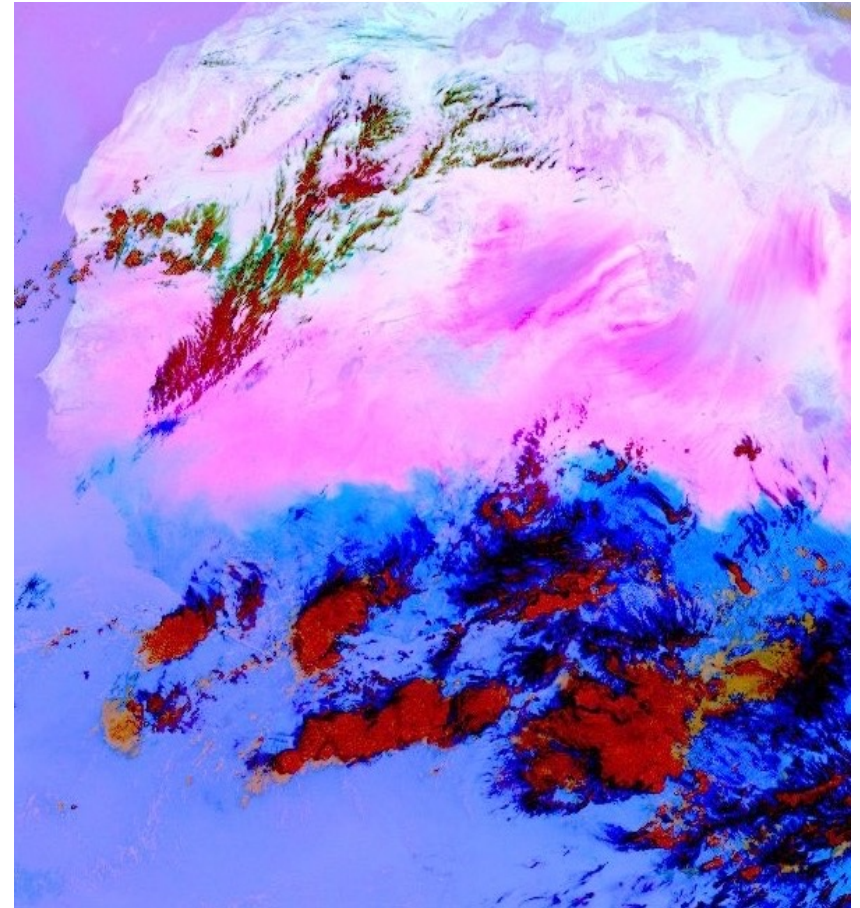
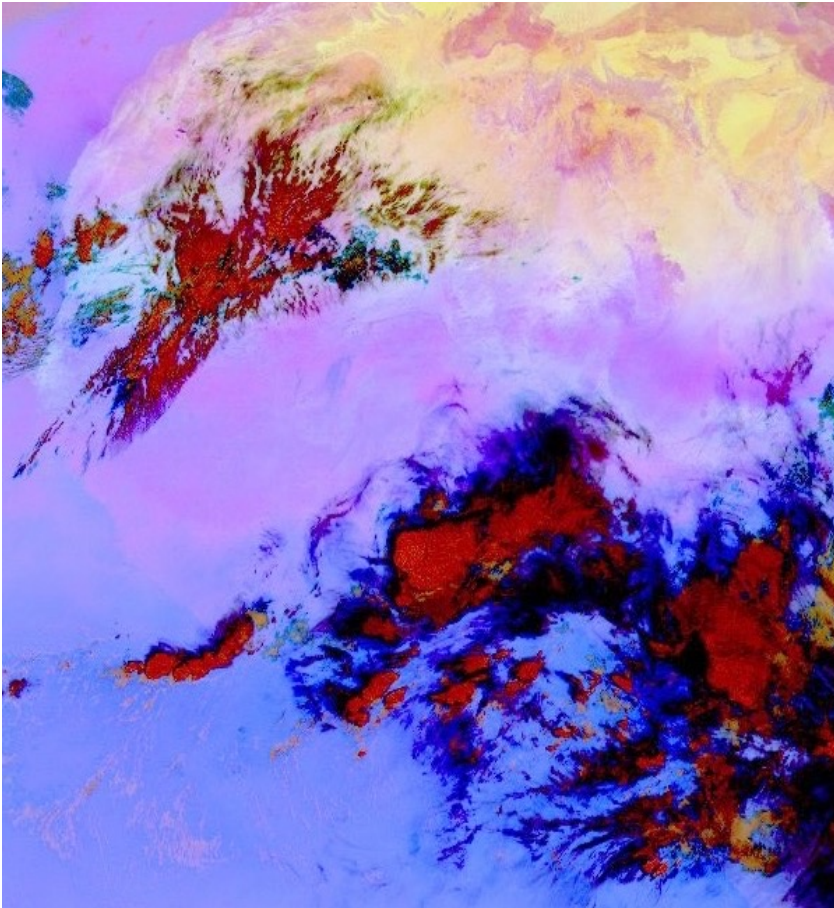
☐

A satellite image of Africa and surrounding regions, processed as a Dust RGB product. The image shows a complex pattern of dust concentrations. High concentrations of dust are visible in the Sahel region, appearing as dark red and brown streaks. Other areas of moderate dust concentration are shown in shades of pink and magenta. The background, representing lower dust concentrations, is primarily light blue and cyan. The map includes white outlines of national borders. A semi-transparent light blue box is overlaid in the upper right corner, containing text. At the bottom center, there is a white text label.

Please, try to draw your own surface
wind vectors on this Dust RGB product,
and identify convergence lines!

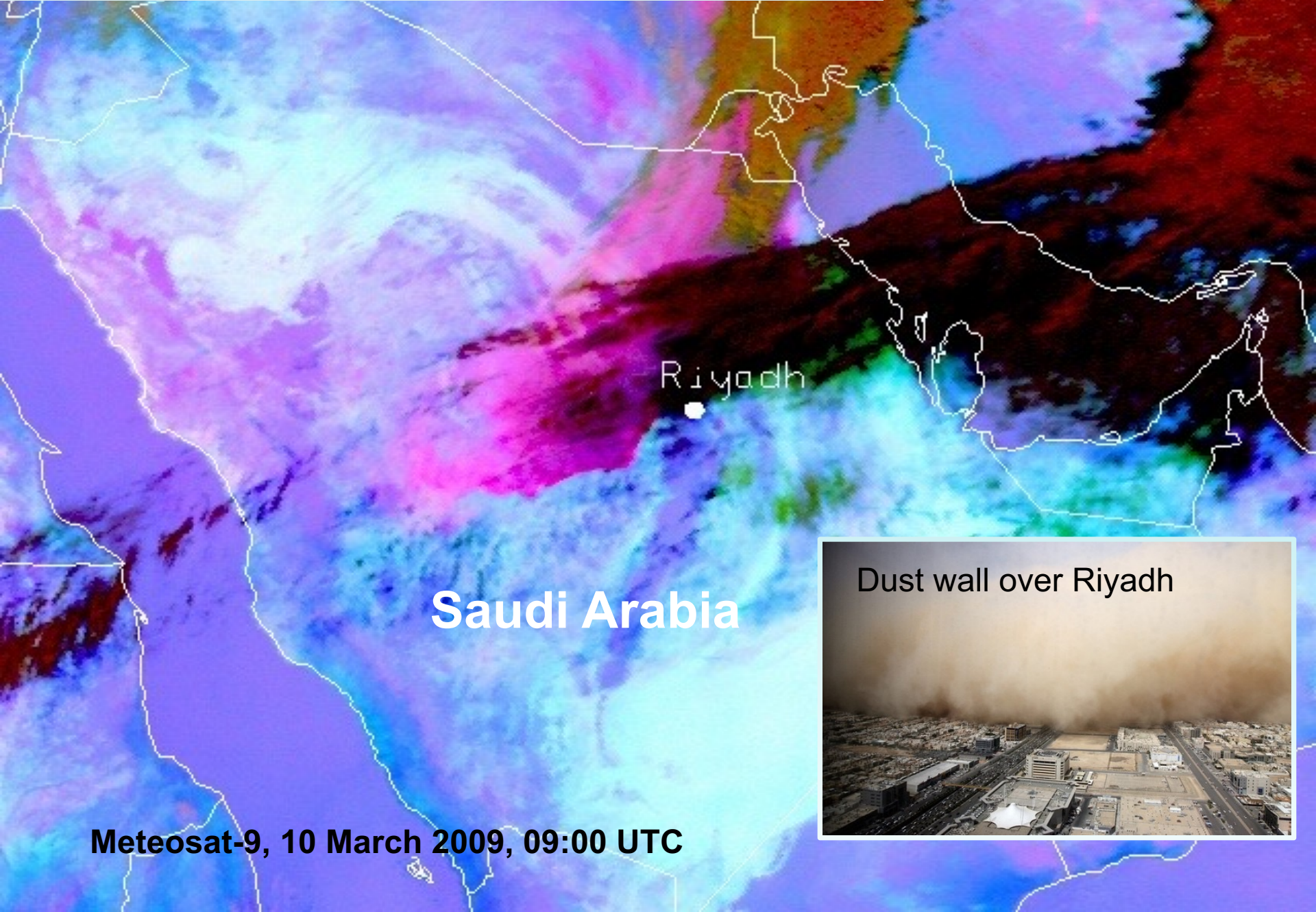
MSG-1, 8 March 2006, 12:00 UTC

Which image is night, and which daytime?



MSG-1, 8 March 2006

Mark the position of the Jet Streams !



Riyadh

Saudi Arabia

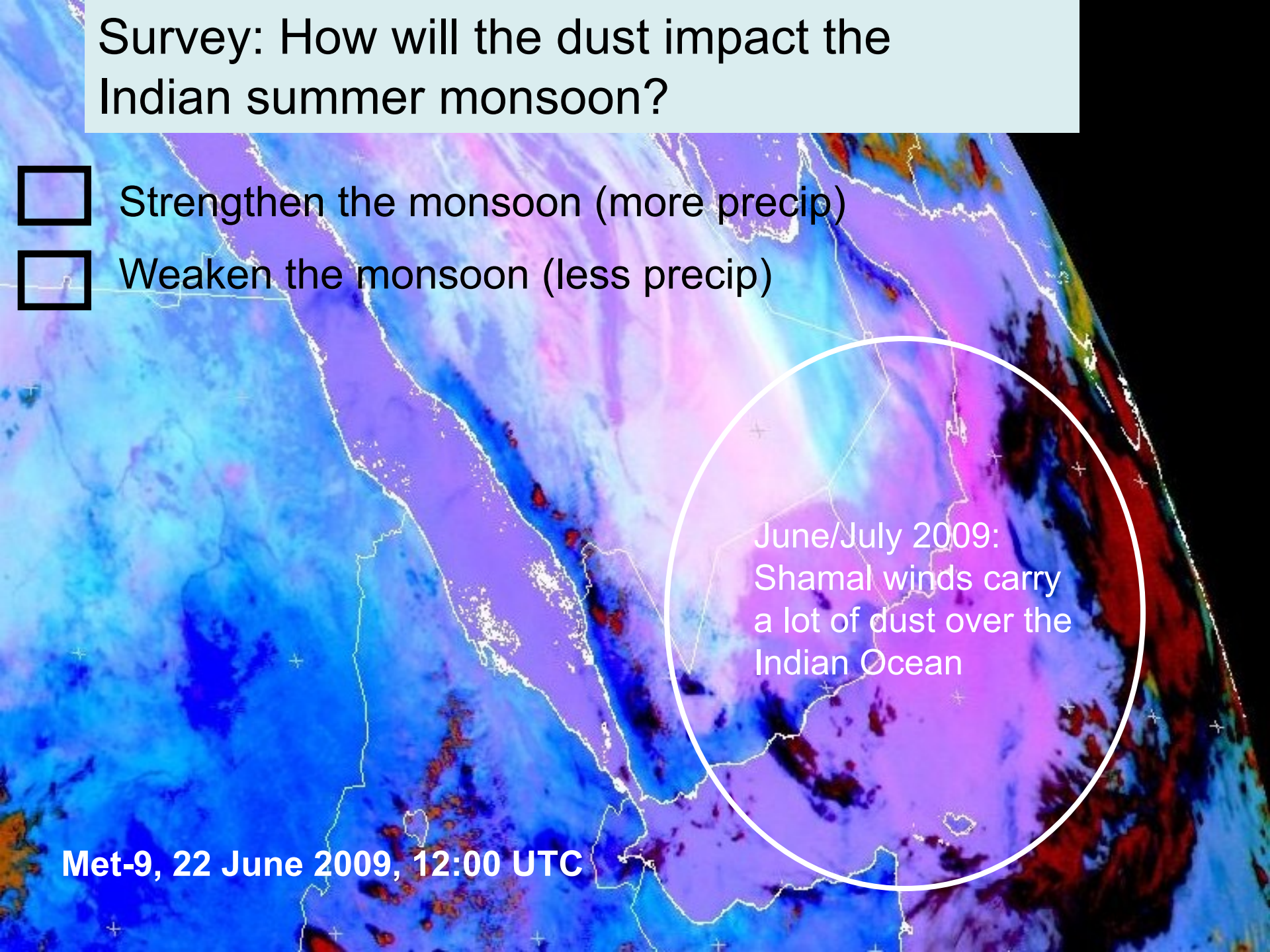
Meteosat-9, 10 March 2009, 09:00 UTC



Dust wall over Riyadh

Survey: How will the dust impact the Indian summer monsoon?

-  Strengthen the monsoon (more precip)
-  Weaken the monsoon (less precip)

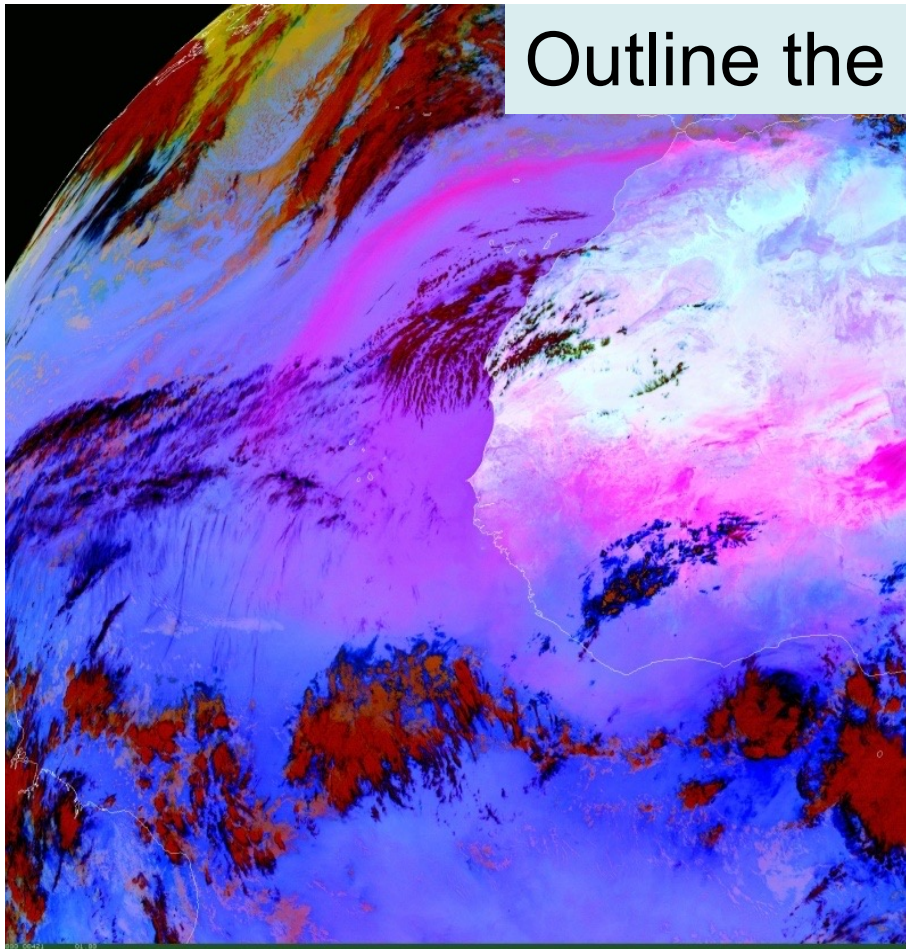


June/July 2009:
Shamal winds carry
a lot of dust over the
Indian Ocean

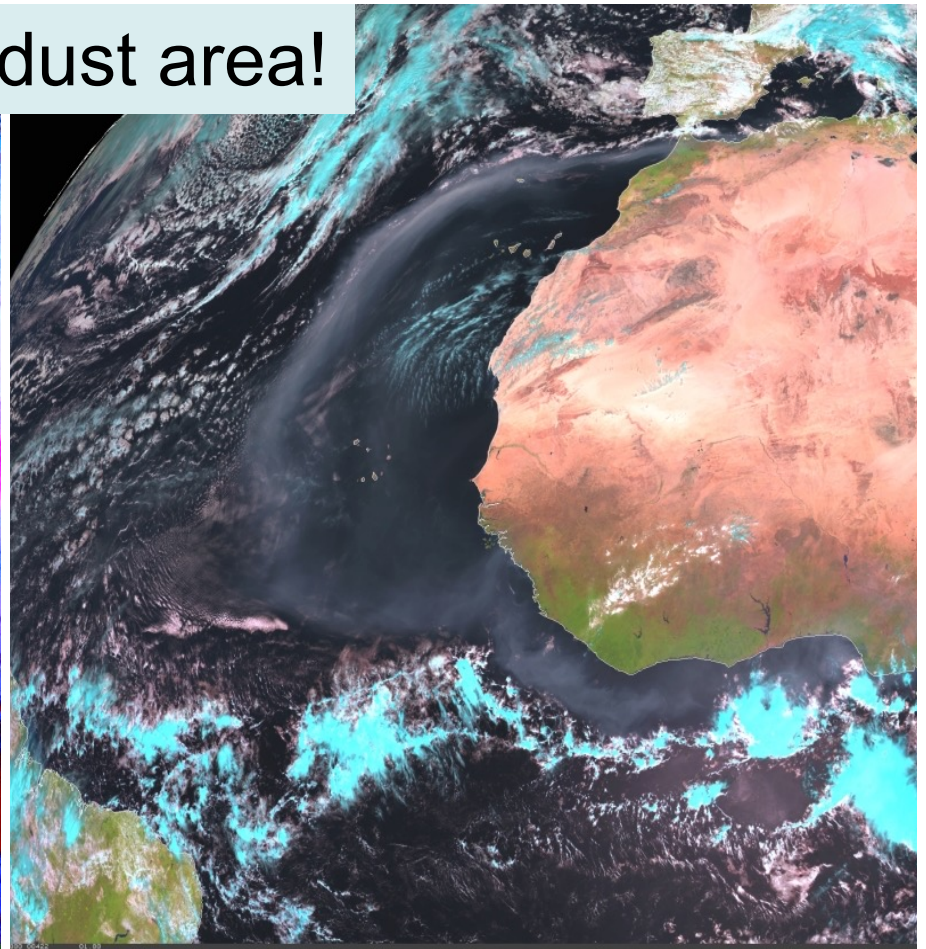
Met-9, 22 June 2009, 12:00 UTC

Detection/Outline of Dust Clouds

Outline the dust area!



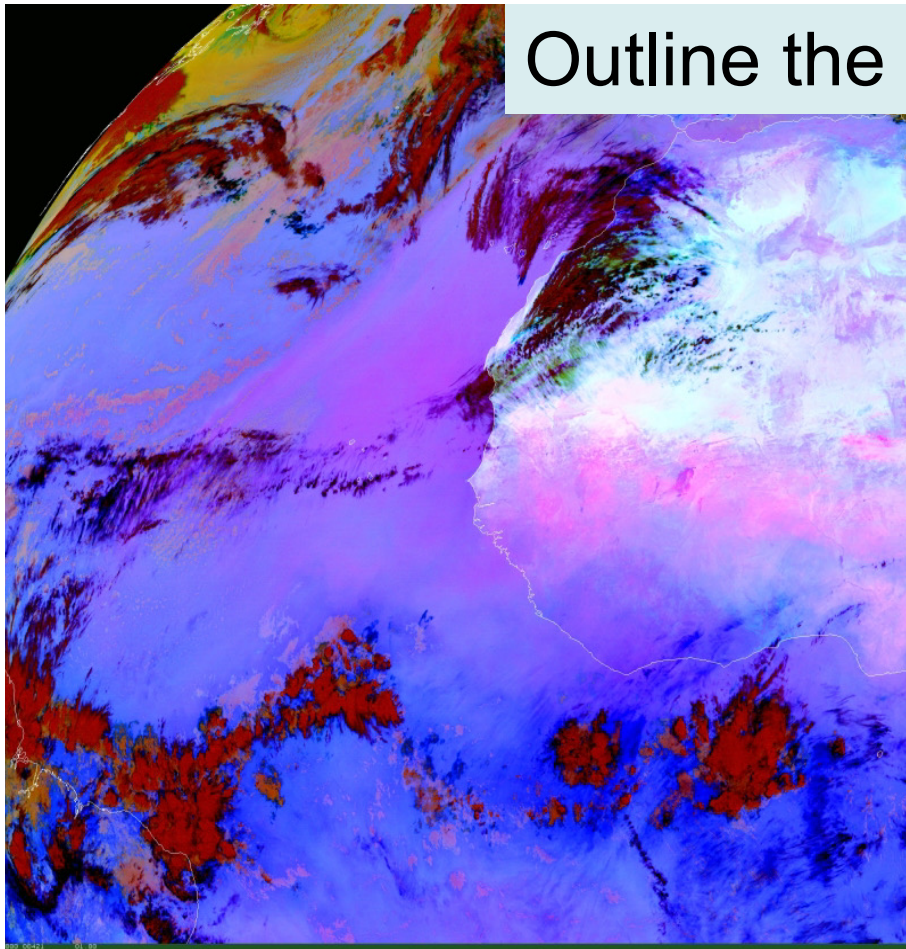
Dust RGB



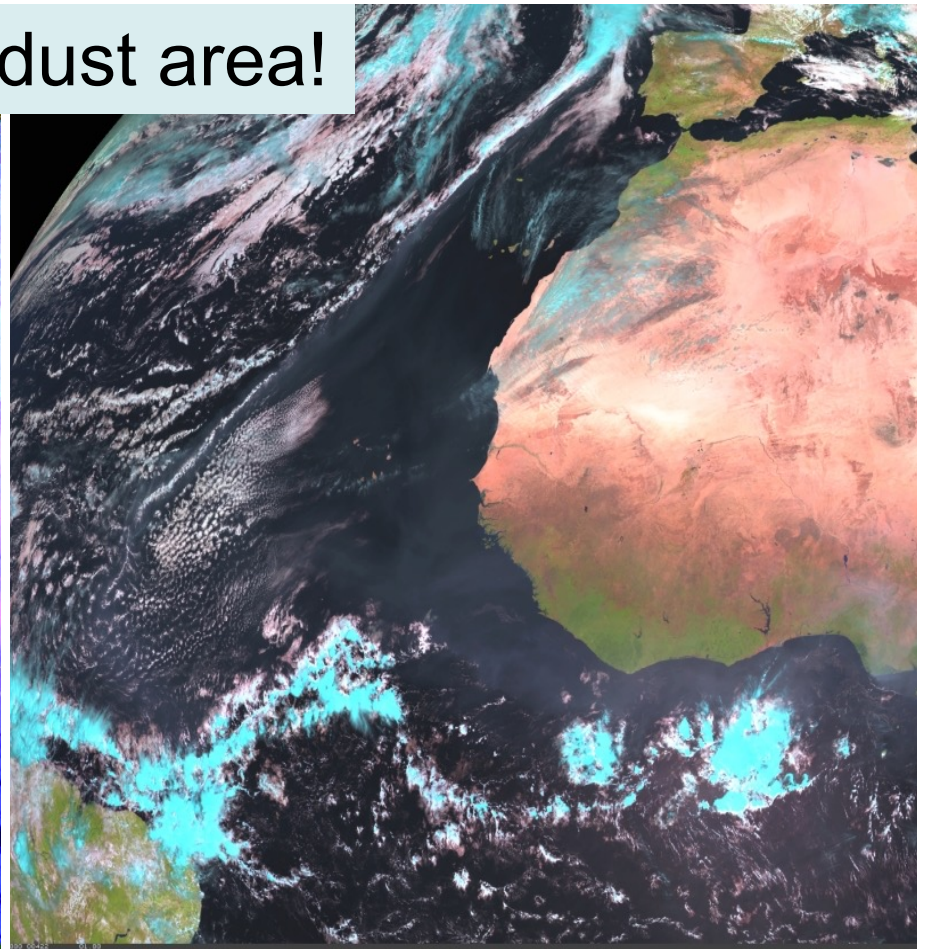
Natural Colours RGB

MSG-1, 06 March 2004, 12:00 UTC

Outline the dust area!



Dust RGB



Natural Colours RGB

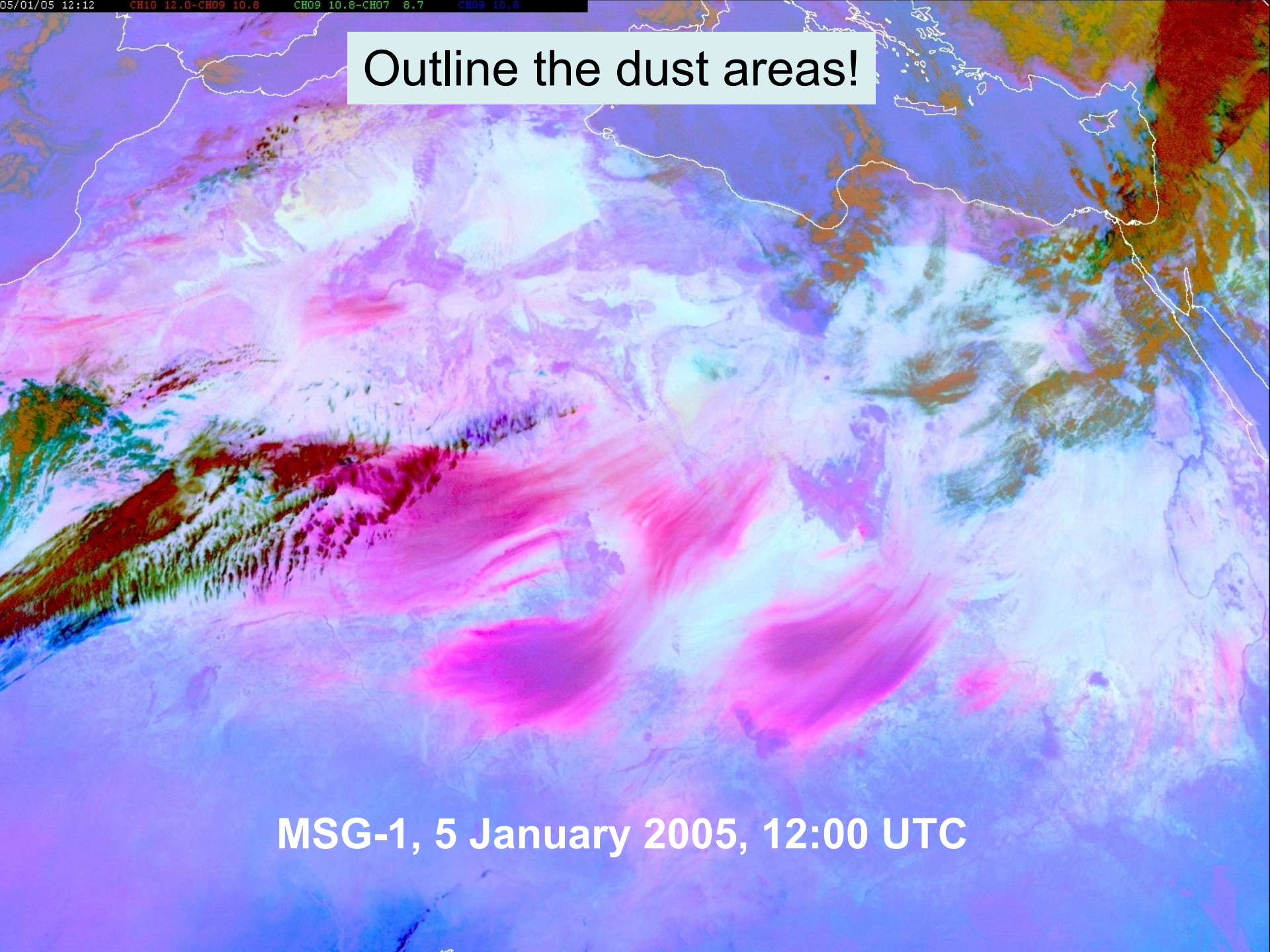
MSG-1, 08 March 2004, 12:00 UTC

Outline the dust areas!
Indicate the wind direction!

Met-9, 1 Feb 2008, 06:30 UTC

DUST - 200802010630

Outline the dust areas!



MSG-1, 5 January 2005, 12:00 UTC

Outline & Height of Dust Clouds

Low = 0 - 1 km

Mid = 2 - 4 km

High = 5 - 6 km

Outline the dust areas!
What is the height of the dust cloud ?

Algeria

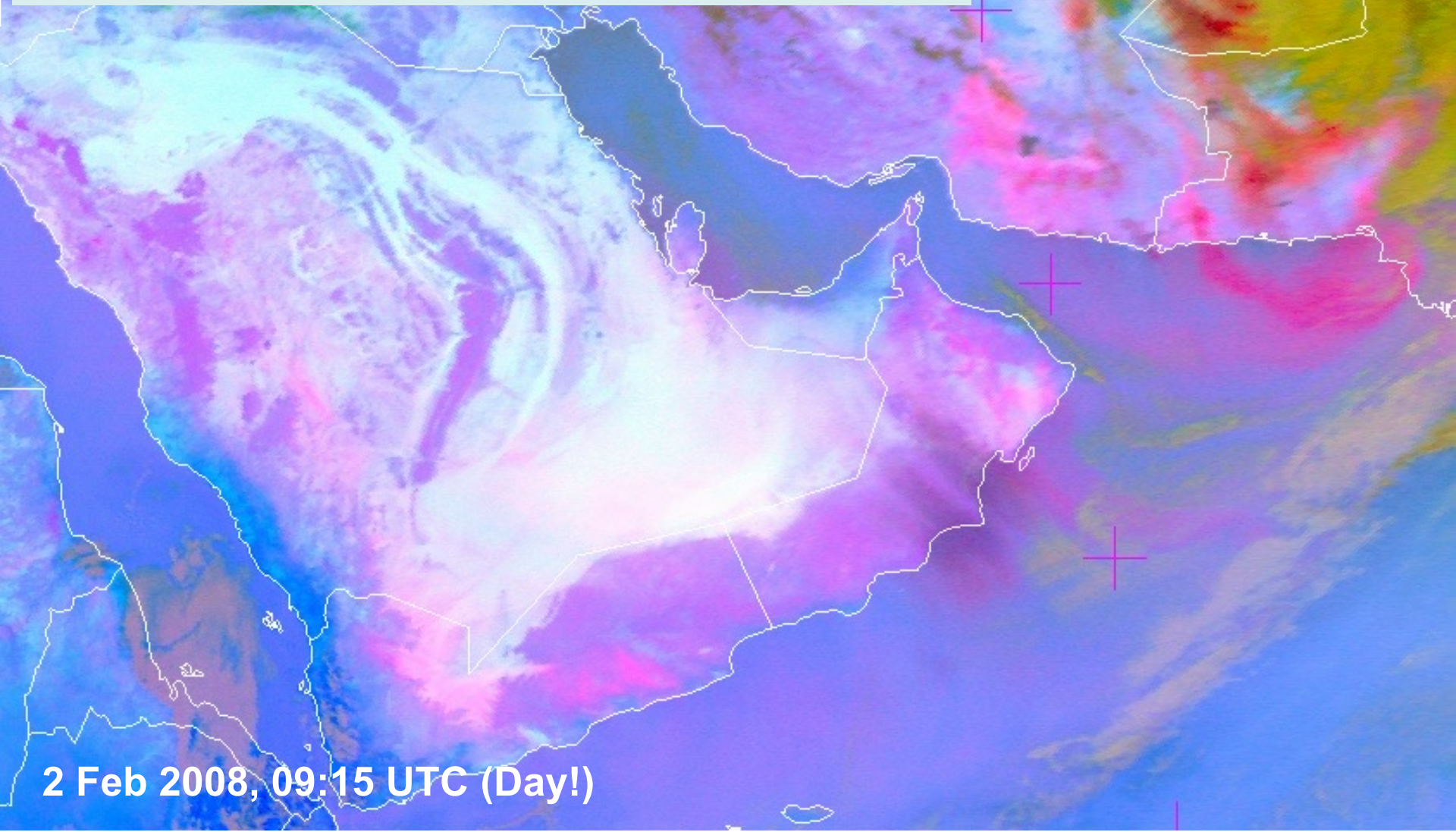
A satellite image of North Africa, specifically focusing on Algeria and Libya. A large, dense dust cloud is visible, originating from the coastal region of Algeria and extending southwards into Libya. The dust cloud is depicted in shades of pink, magenta, and purple, contrasting with the green and brown landmasses. The word 'Algeria' is written in white text on the right side of the image. The image also shows the Mediterranean Sea to the west and the Red Sea to the east. Several small white crosses are marked on the map, likely indicating specific locations of interest.

21 February 2007, 02:00 UTC (NIGHT!)

Dust Outbreak Middle East

2 Feb 2008

Where & how high is the dust cloud?

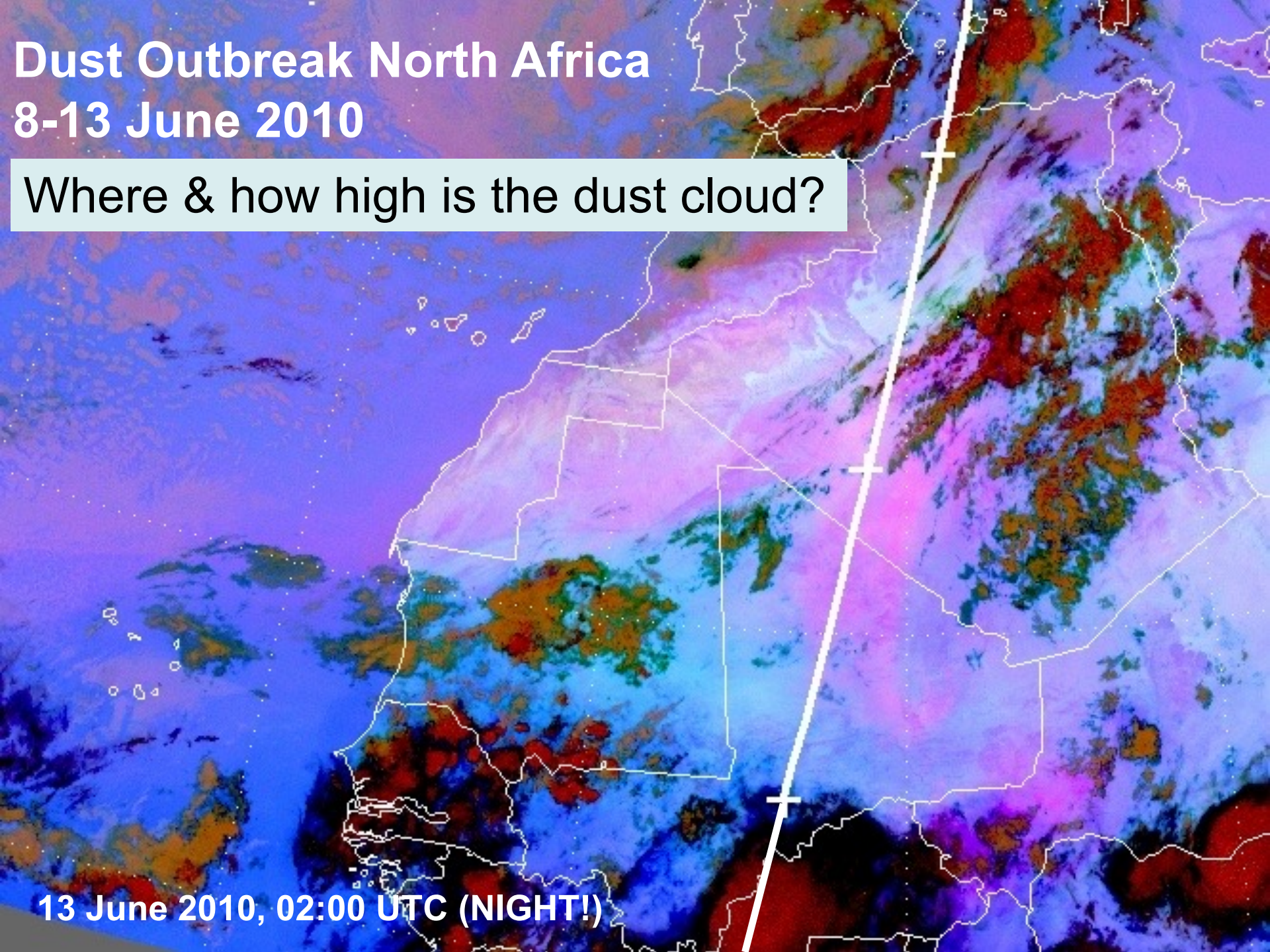


2 Feb 2008, 09:15 UTC (Day!)

Dust Outbreak North Africa 8-13 June 2010

Where & how high is the dust cloud?

13 June 2010, 02:00 UTC (NIGHT!)



Dust Outbreak Middle East

24 June 2010

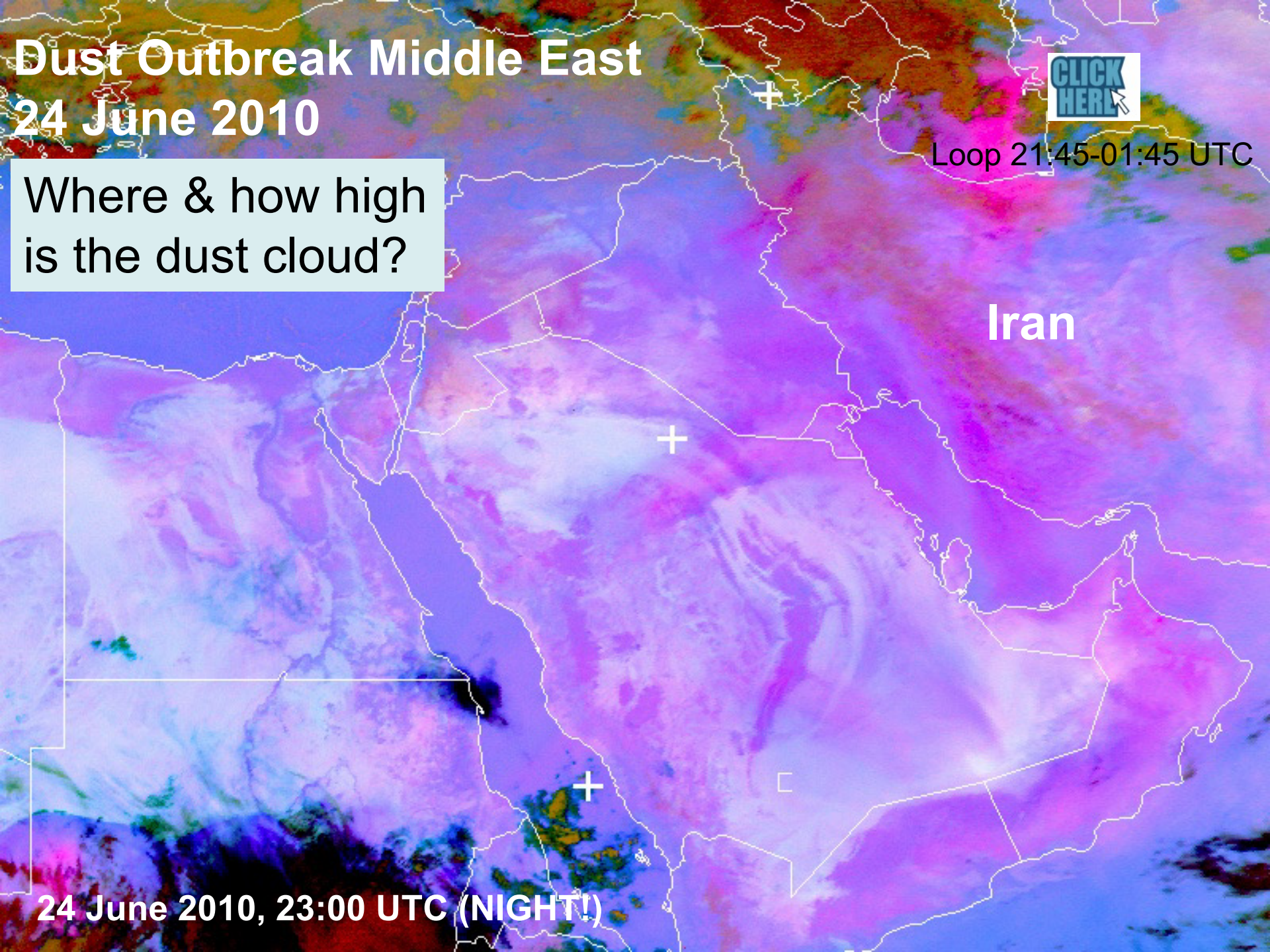


Loop 21:45-01:45 UTC

Where & how high
is the dust cloud?

Iran

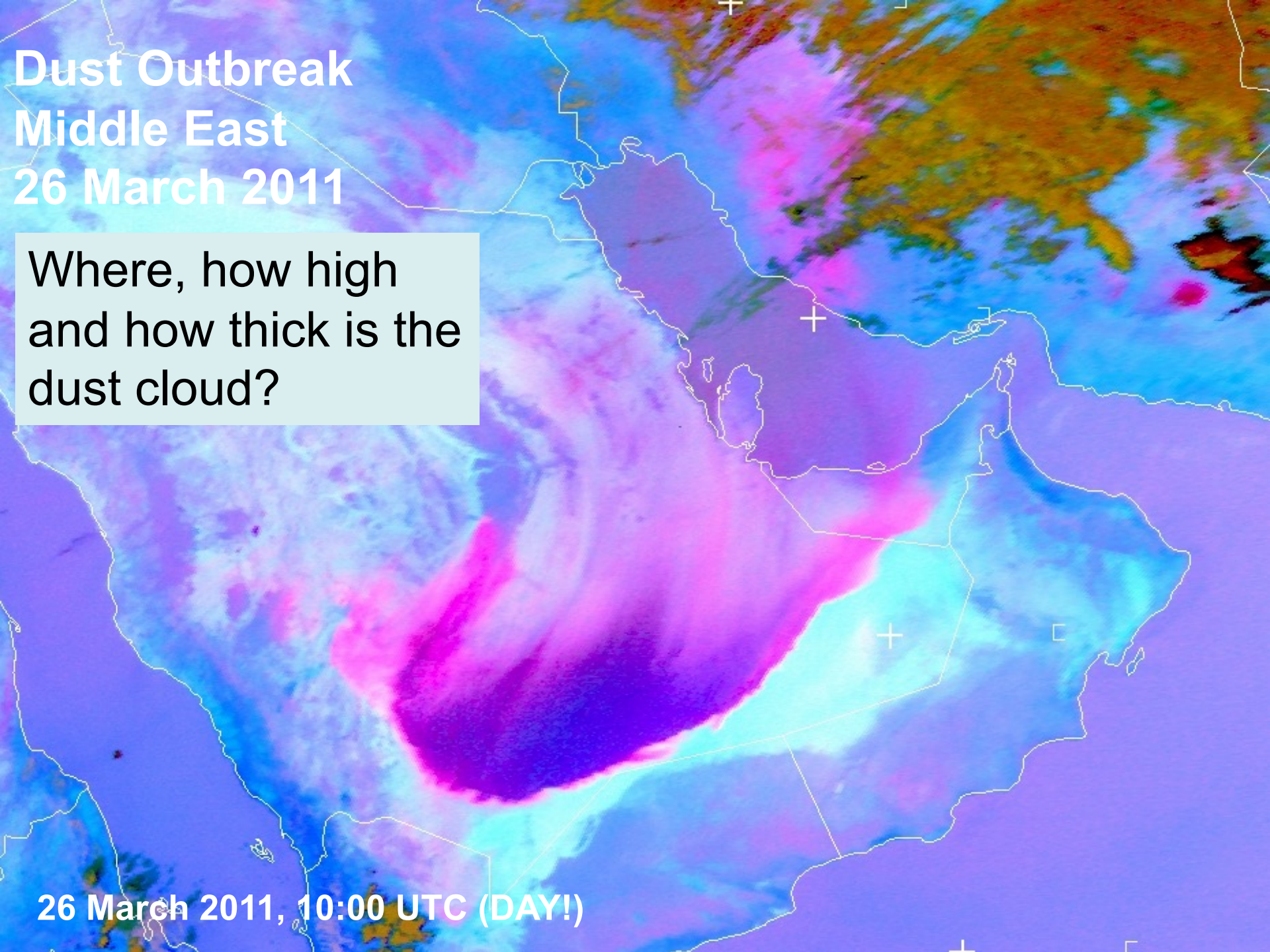
24 June 2010, 23:00 UTC (NIGHT!)



Dust Outbreak Middle East 26 March 2011

Where, how high
and how thick is the
dust cloud?

26 March 2011, 10:00 UTC (DAY!)

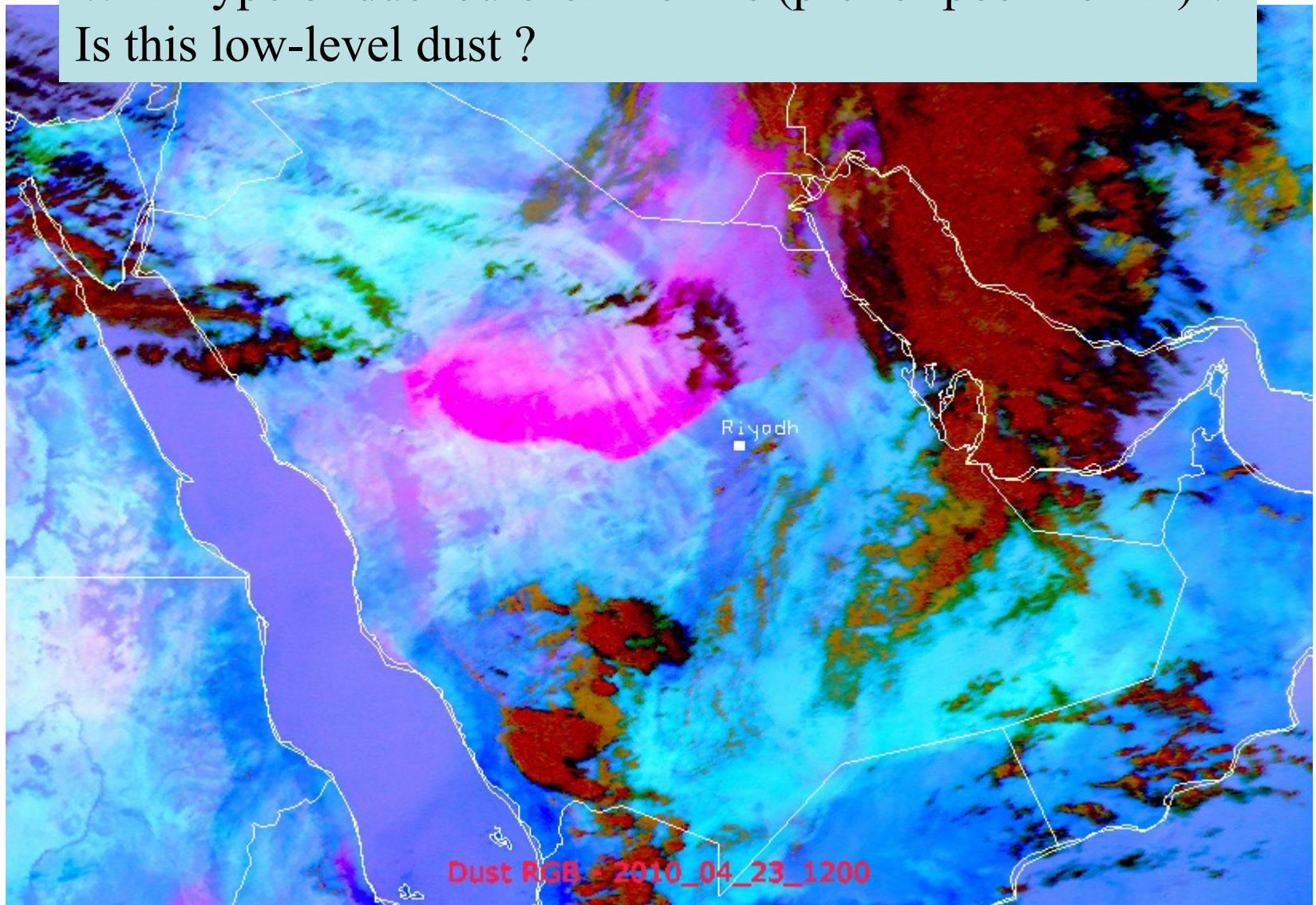


Dust Nowcasting Exercises

When will the dust cloud reach Riyadh ?

What type of dust outbreak is this (pre- or post frontal) ?

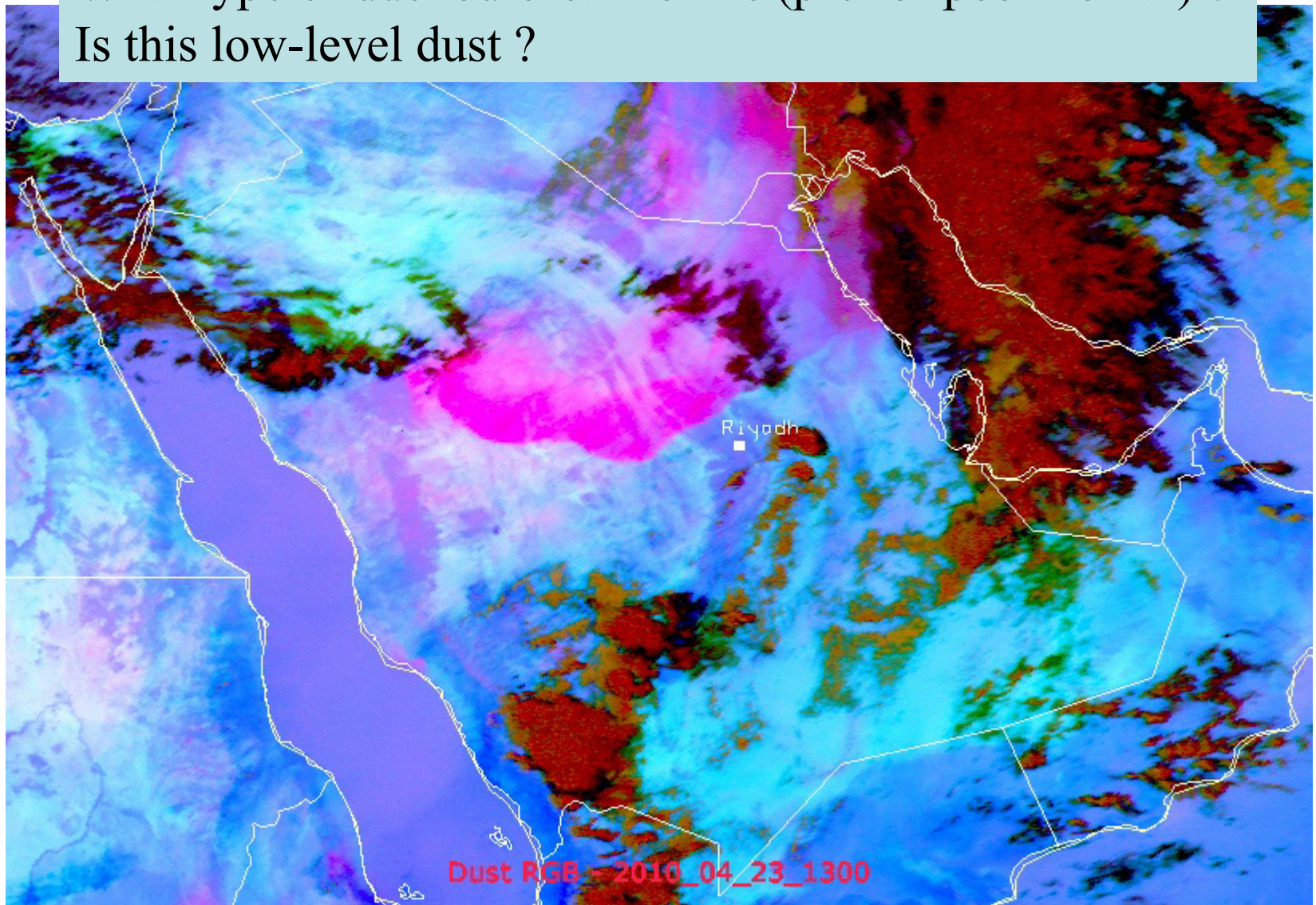
Is this low-level dust ?



When will the dust cloud reach Riyadh ?

What type of dust outbreak is this (pre- or post frontal) ?

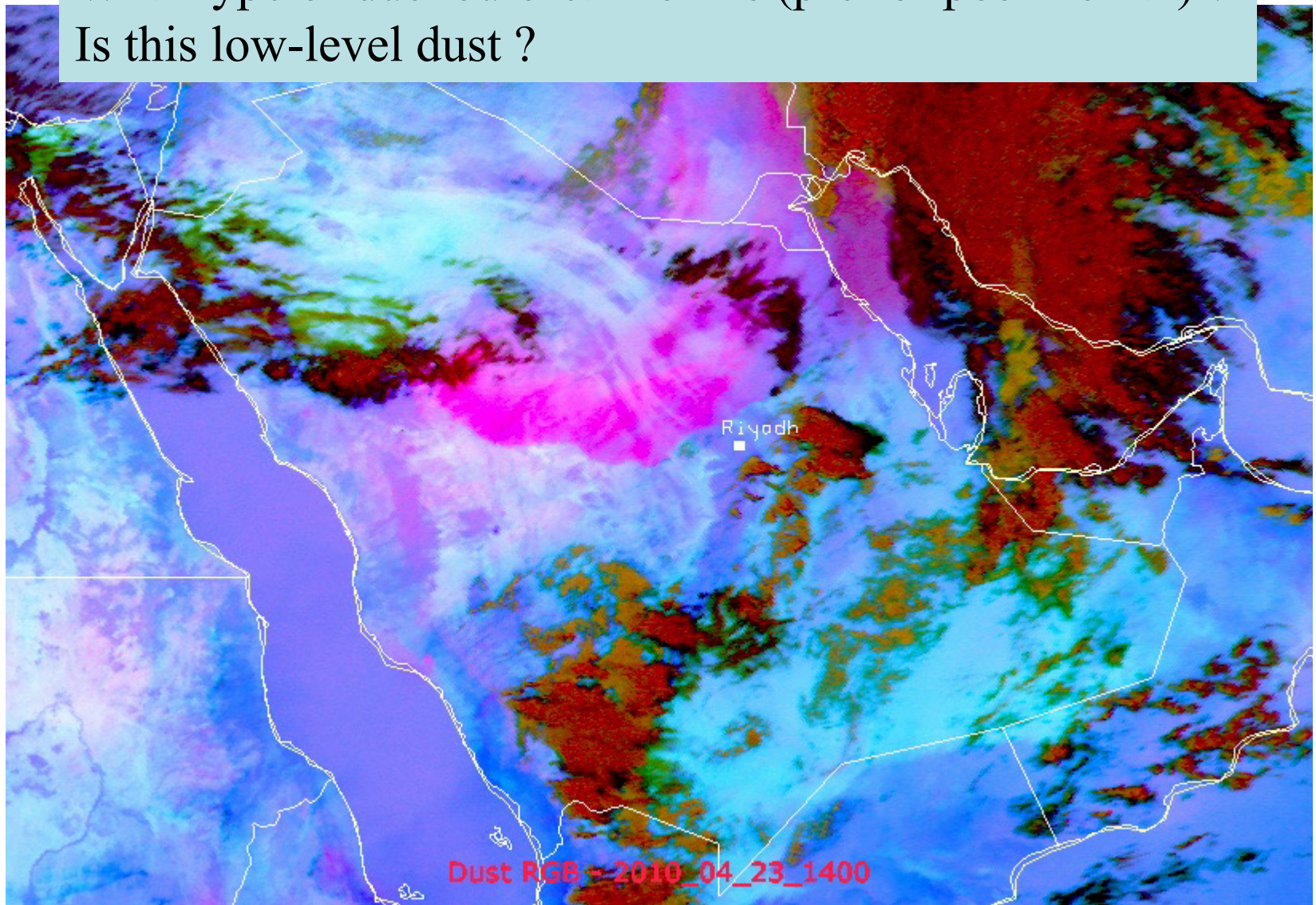
Is this low-level dust ?



When will the dust cloud reach Riyadh ?

What type of dust outbreak is this (pre- or post frontal) ?

Is this low-level dust ?



In which direction will the dust cloud move ?
What type of dust outbreak is this ?
Is this high-level or low-level dust ?

Algeria

Tunisia

Met-8, 13 June 2005, 11:00 UTC

13 Nov 2009, 06:00 Z

Make a 6 h dust forecast ?

What type of dust outbreak is this ?

Is this high-level or low-level dust ?

Make a dust forecast for the following days ?

**Tibesti
Mountains**

**Ennedi
Mountains**

13 Nov 2009, 08:00 Z

Make a 6 h dust forecast ?

What type of dust outbreak is this ?

Is this high-level or low-level dust ?

Make a dust forecast for the following days ?

**Tibesti
Mountains**

**Ennedi
Mountains**

13 Nov 2009, 10:00 Z

Make a 6 h dust forecast ?

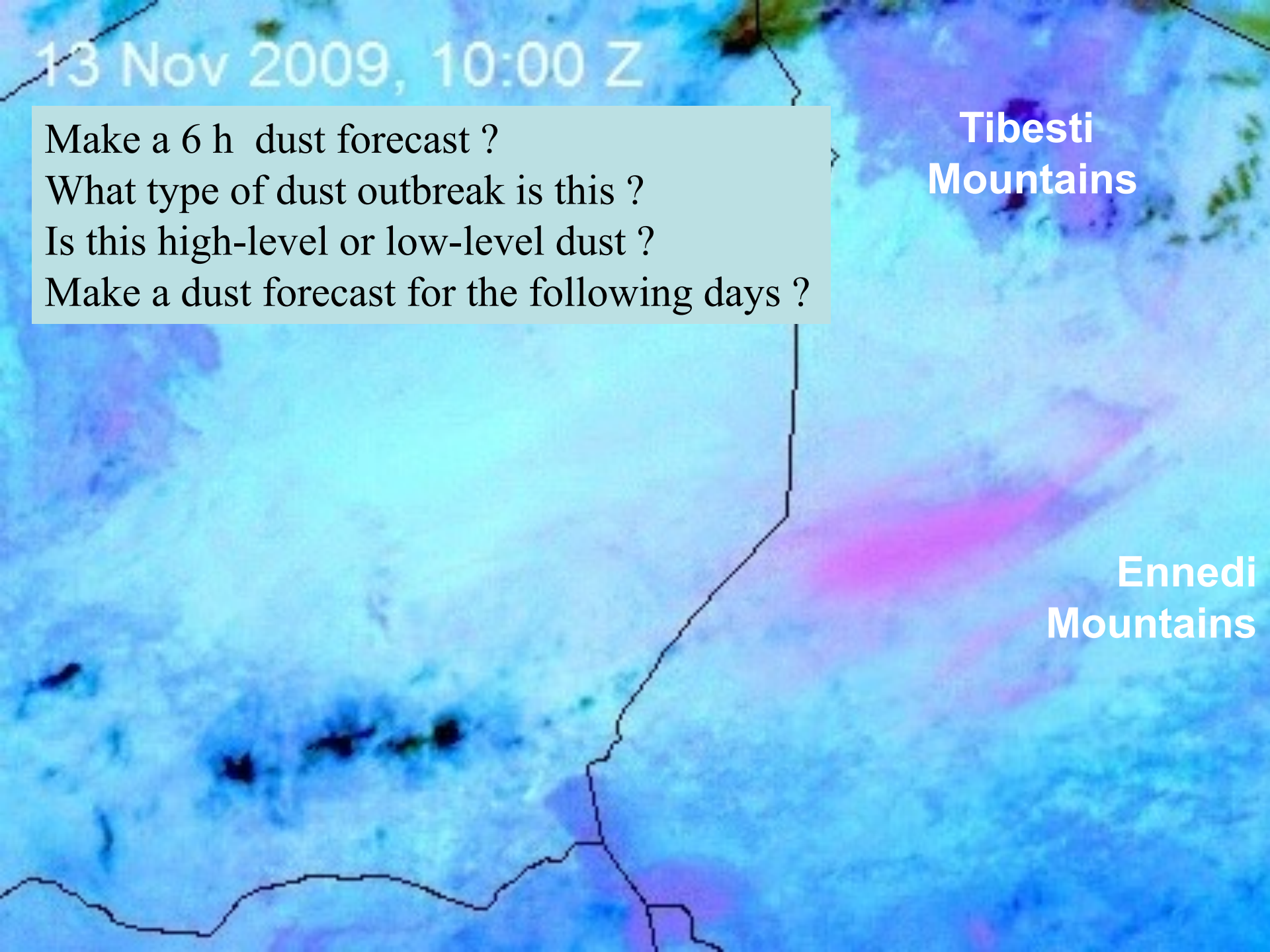
What type of dust outbreak is this ?

Is this high-level or low-level dust ?

Make a dust forecast for the following days ?

**Tibesti
Mountains**

**Ennedi
Mountains**



13 Nov 2009, 12:00 Z

Make a 6 h dust forecast ?

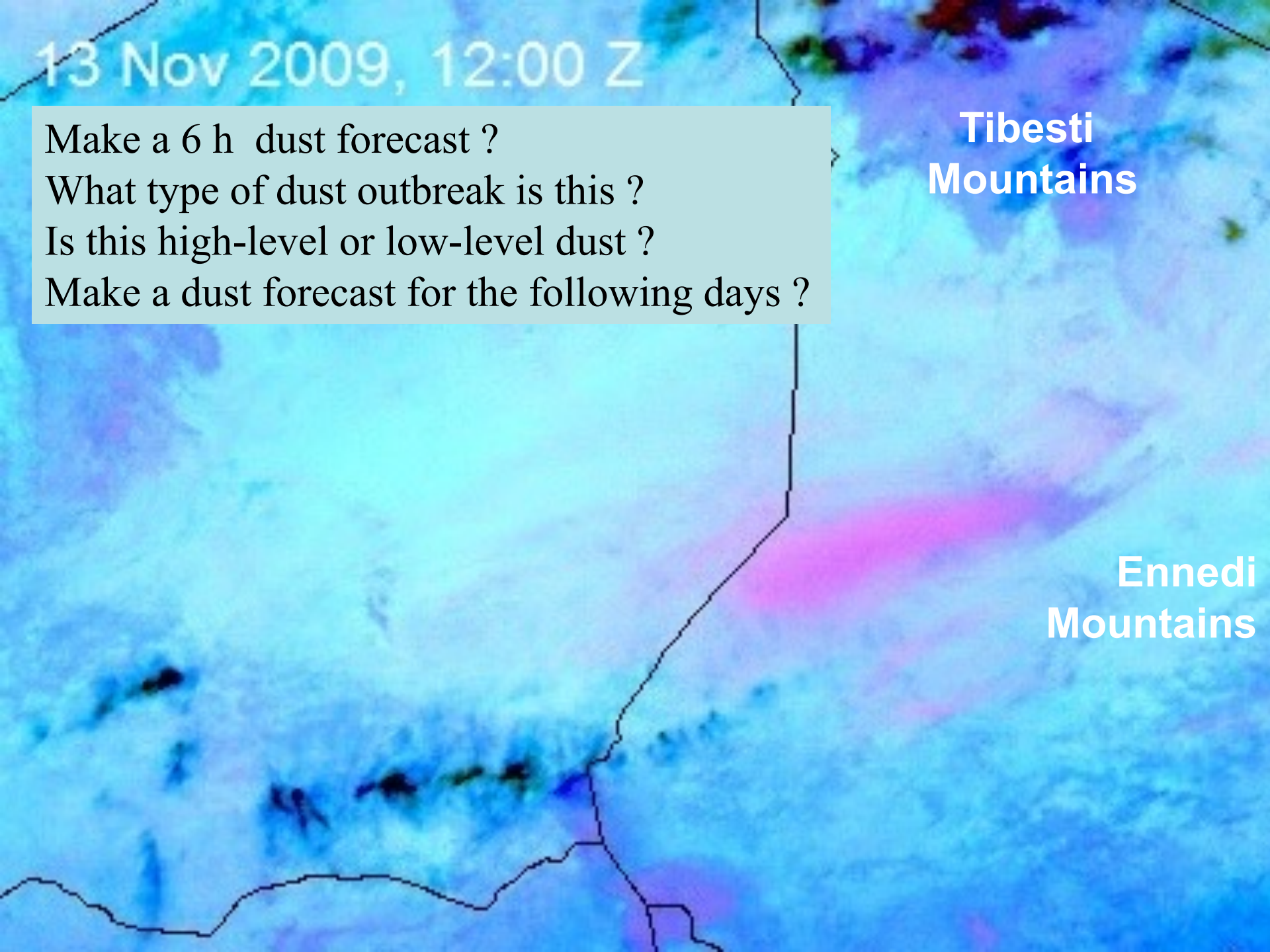
What type of dust outbreak is this ?

Is this high-level or low-level dust ?

Make a dust forecast for the following days ?

**Tibesti
Mountains**

**Ennedi
Mountains**



Congratulations!

You have finished the exercises!