

ON The Dust Storms Over KSA



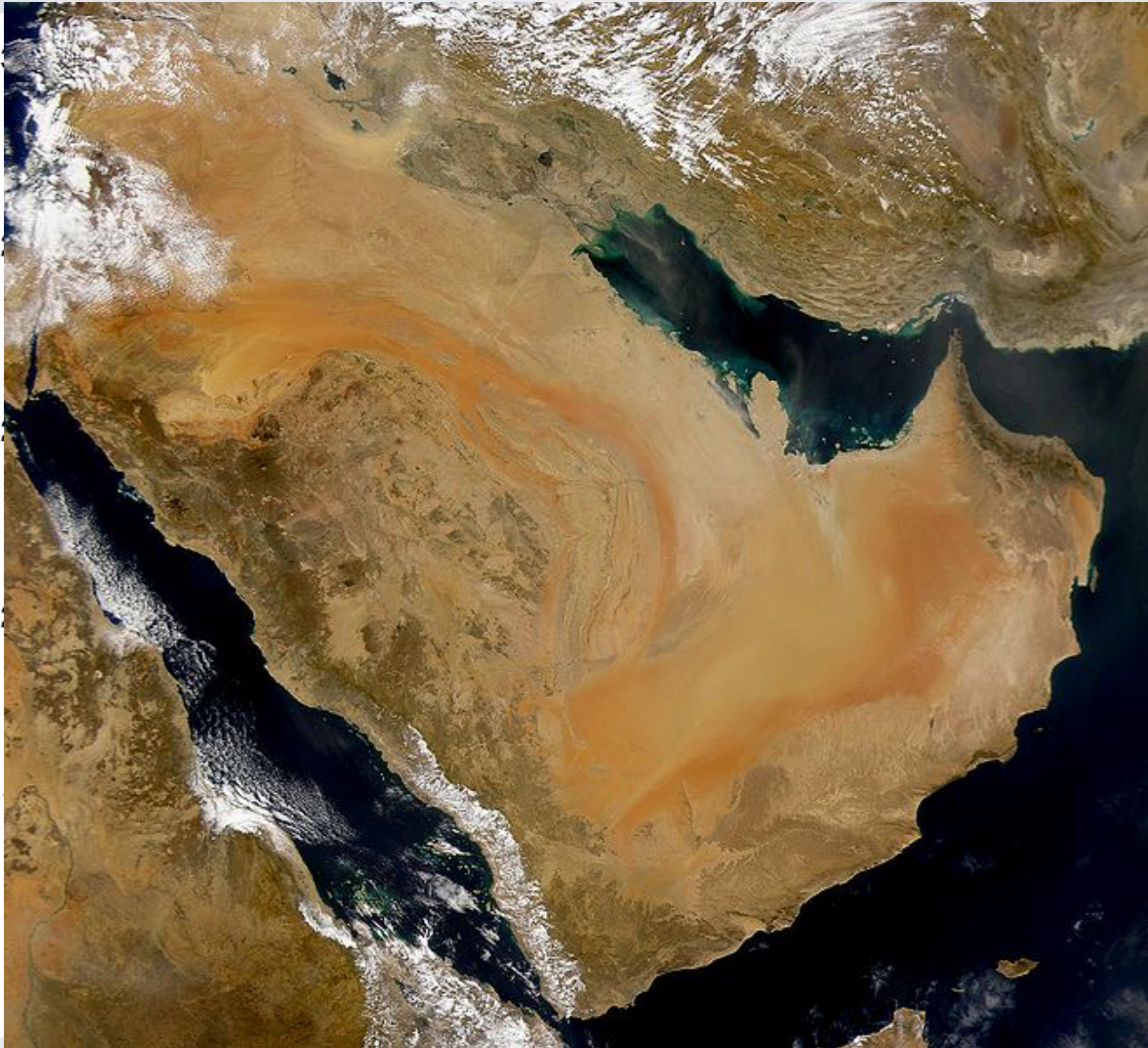
Ayman AlBar



Content

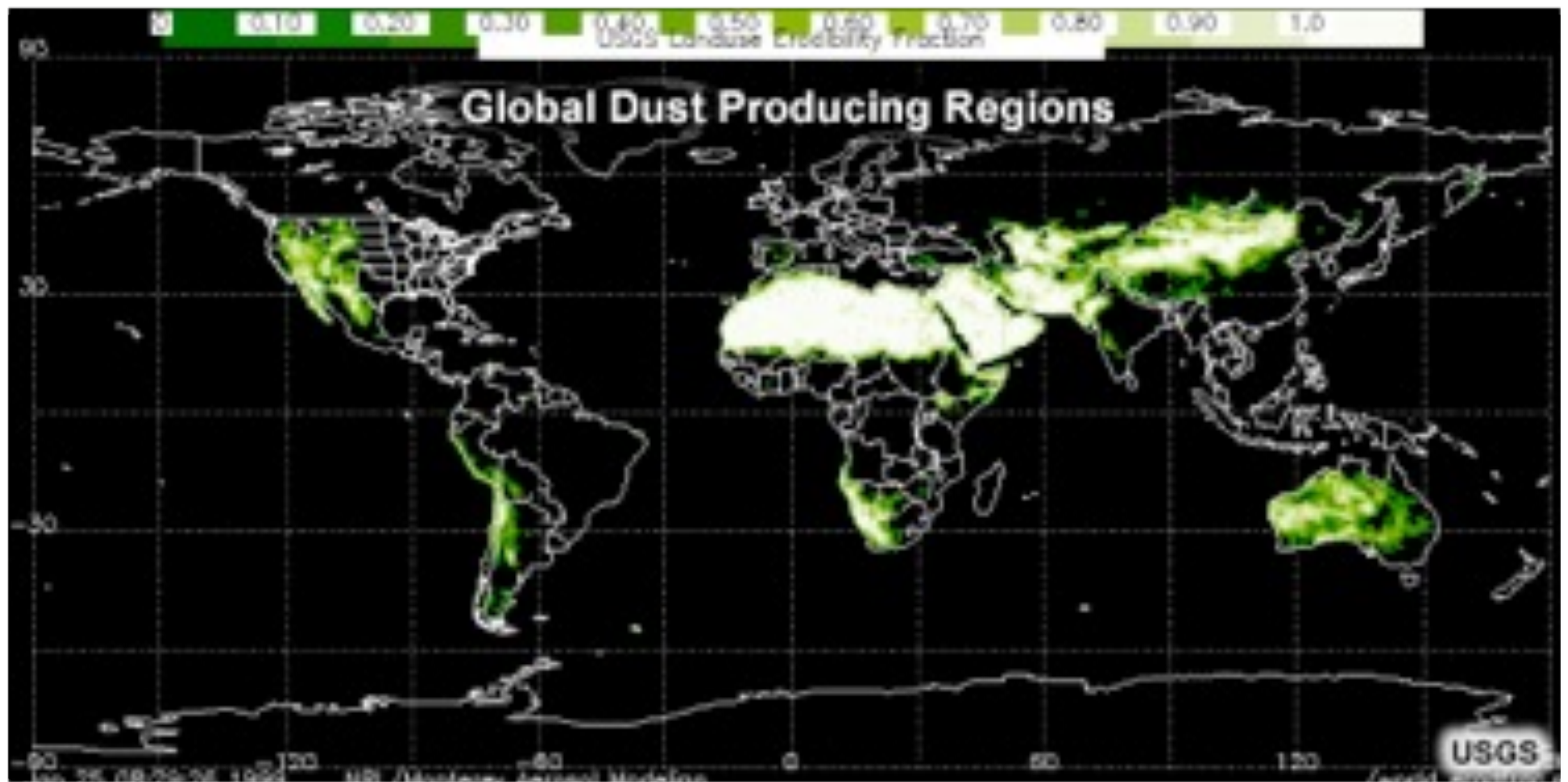
- **Region & Location**
- **Source & Type of Dust**
- **Relation between the wind & Particle Size**
- **Relationship between the size of particles and the time of landing to the surface.**
- **The average of seasonal and annual frequency of Sand storms over KSA**
- **Causes of sand storm**
- **Cases Study**

Region & Location

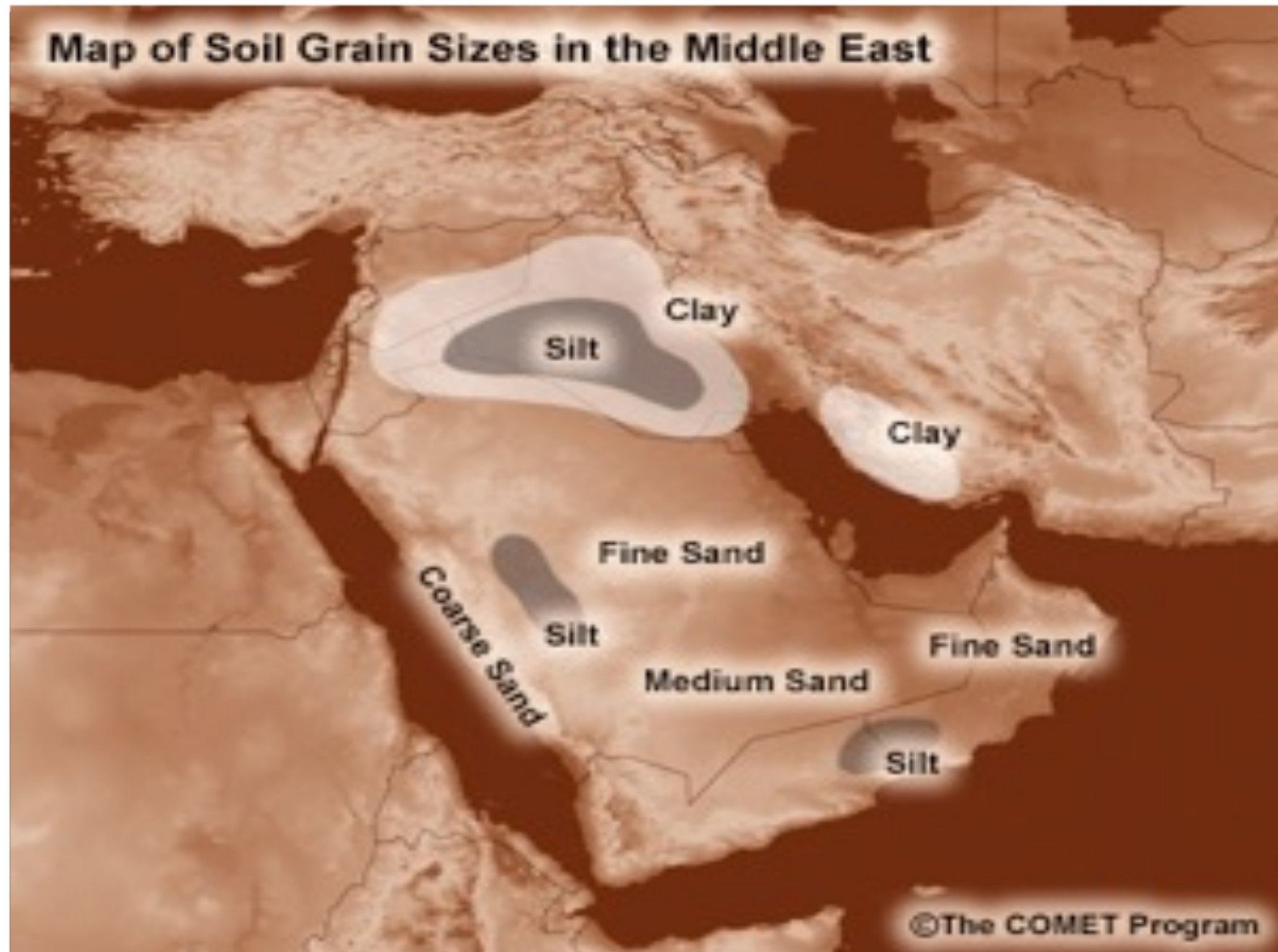


Dust Source Regions

Global



Middle East



Threshold Dust-lofting Wind Speed for Different Desert Environments

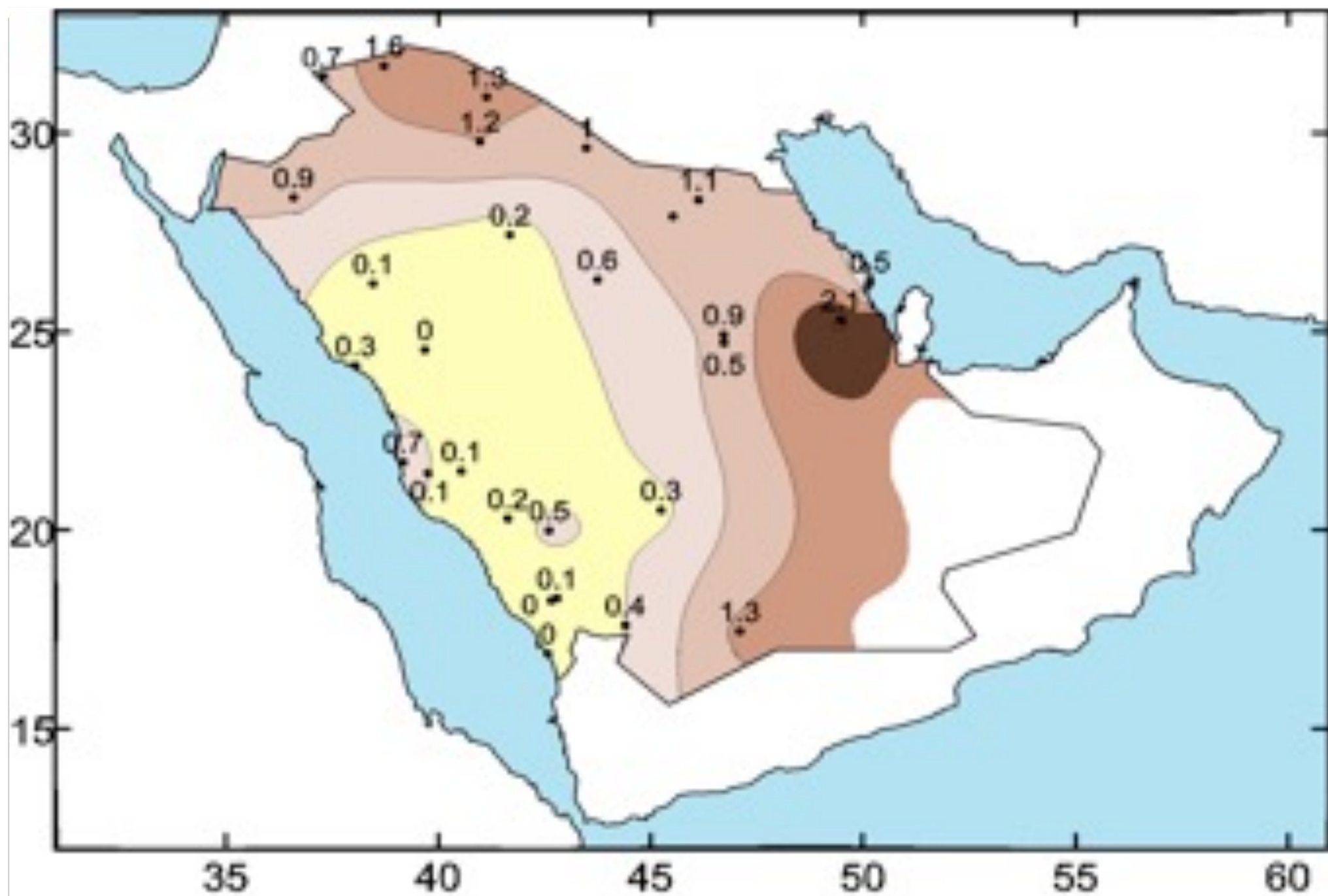
Environment	Threshold Wind Speed
Fine to medium sand in dune-covered areas	10-15 mph (8.7-13 knots)
Sandy areas with poorly developed desert pavement	20 mph (17.4 knots)
Fine material, desert flats	20-25 mph (17.4-21.7 knots)
Alluvial fans and crusted salt flats (dry lake beds)	30-35 mph (26.1-30.4 knots)
Well-developed desert pavement	40 mph (36.8 knots)

The relationship between the size of particles and the time of landing to the surface.

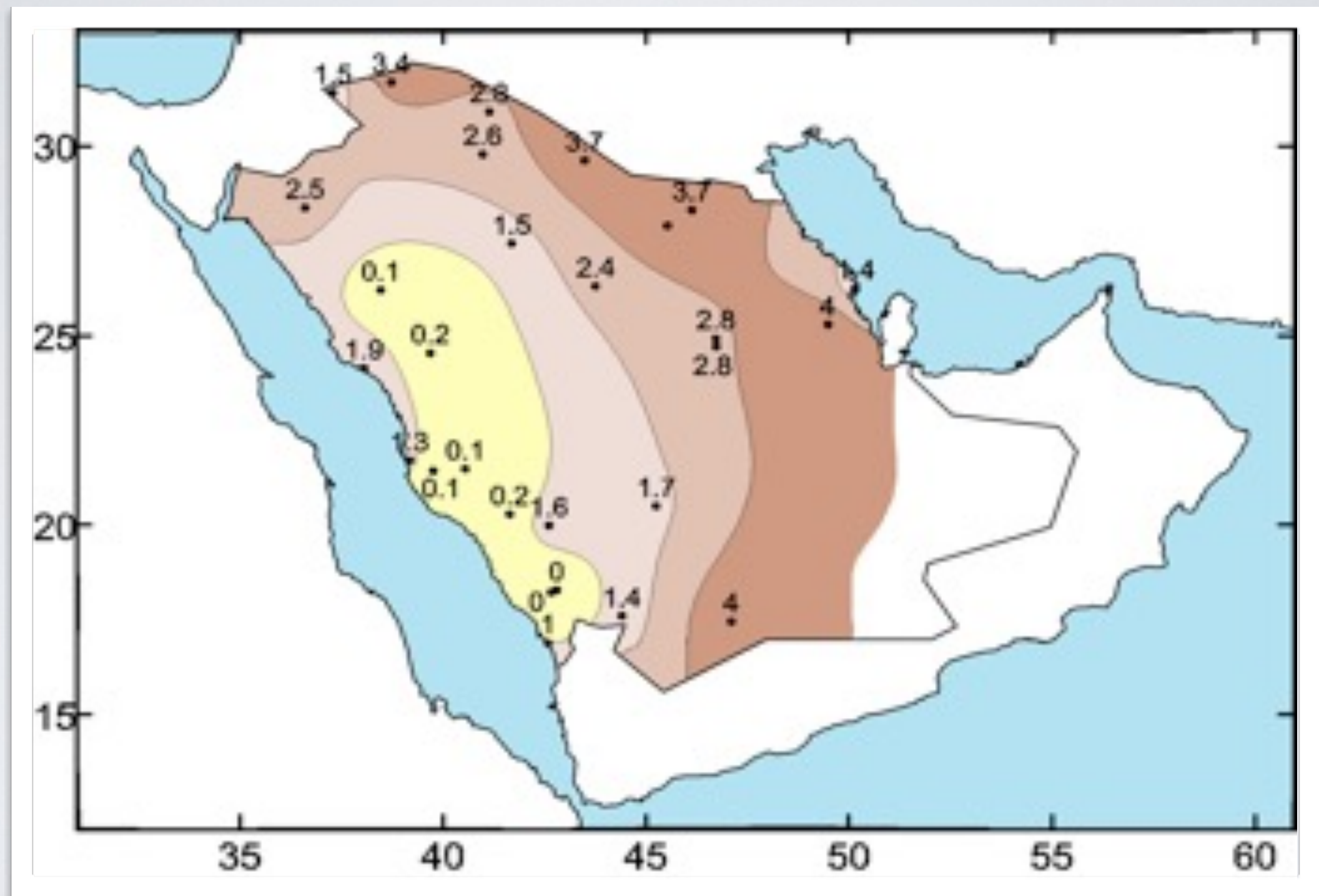
Diameter of dust particles	The time of landing to the ground
1000 μm	1.6 min
100 μm	1.66 min
10 μm	5.55 hr
1 μm	25.9 day

The average of seasonal and annual frequency of Sand storms over KSA

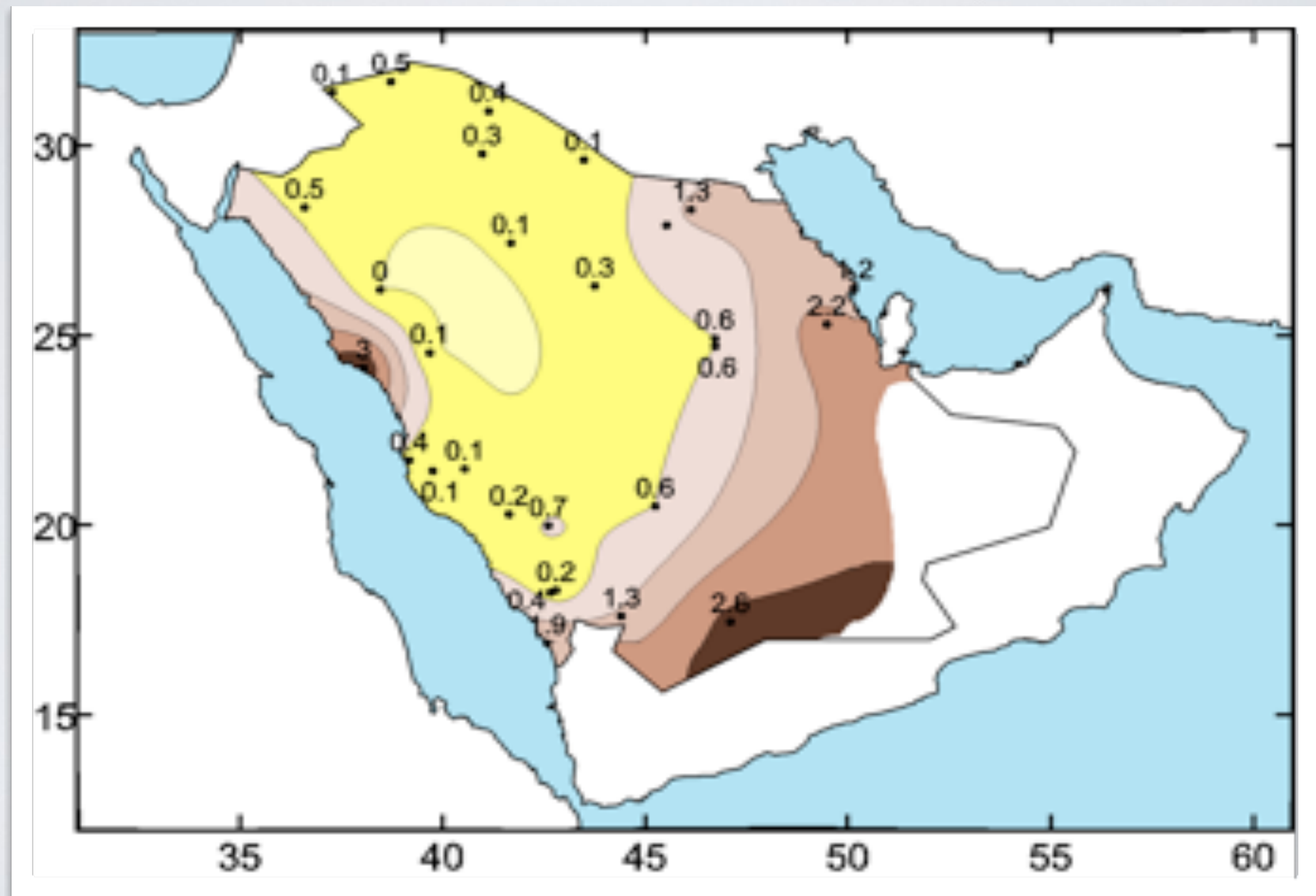
WINTER



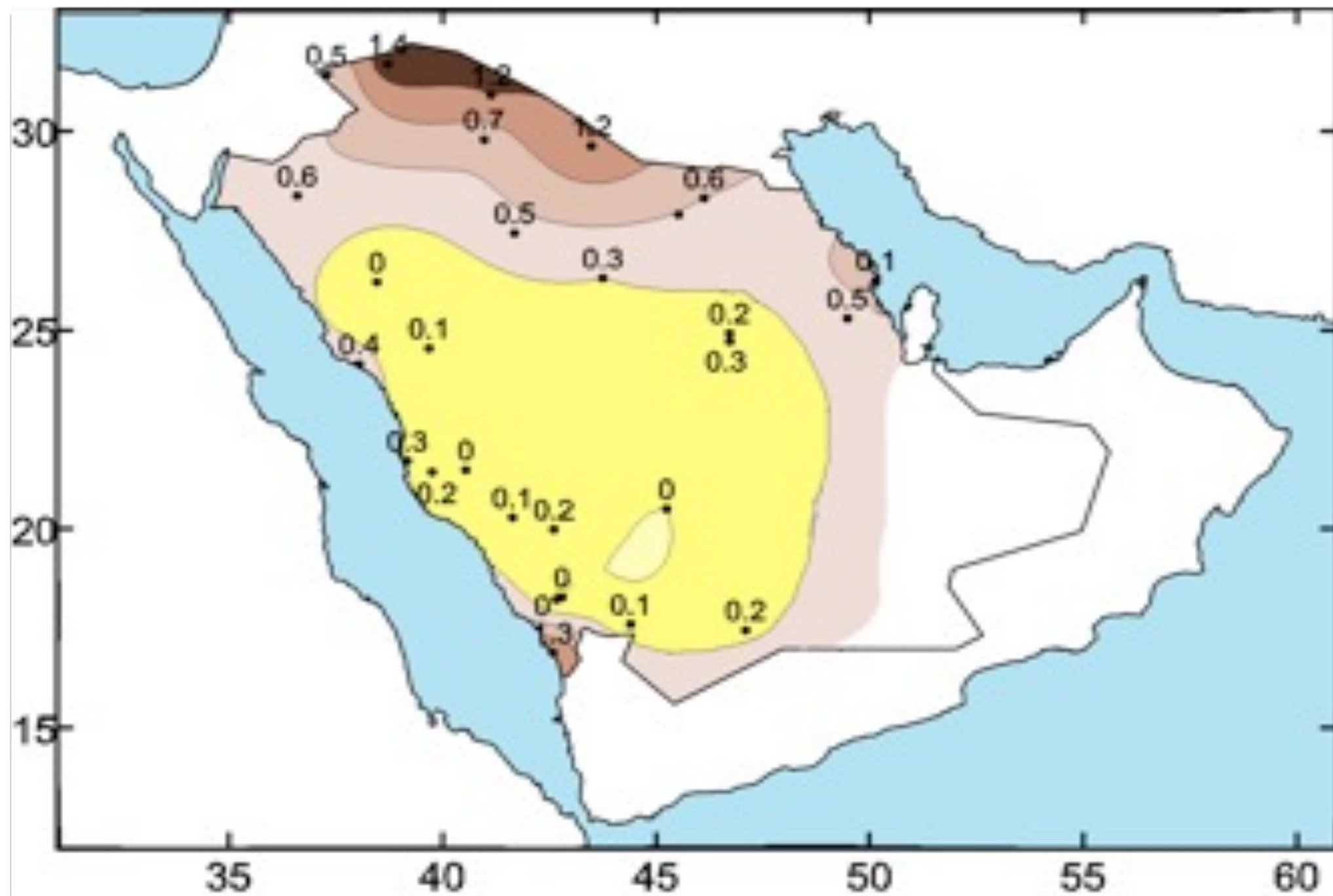
Spring



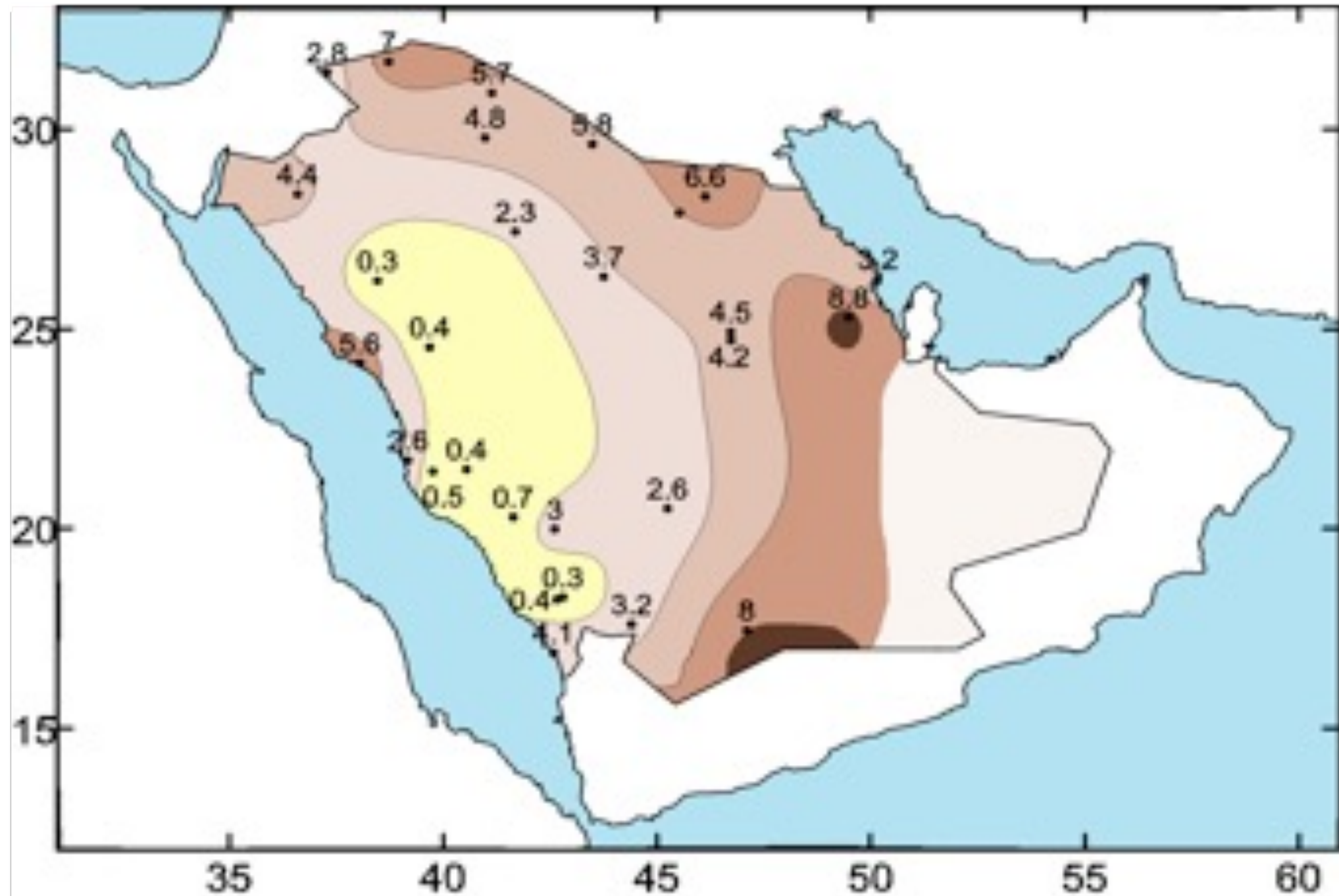
SUMMER



FAI



Annual Distribution



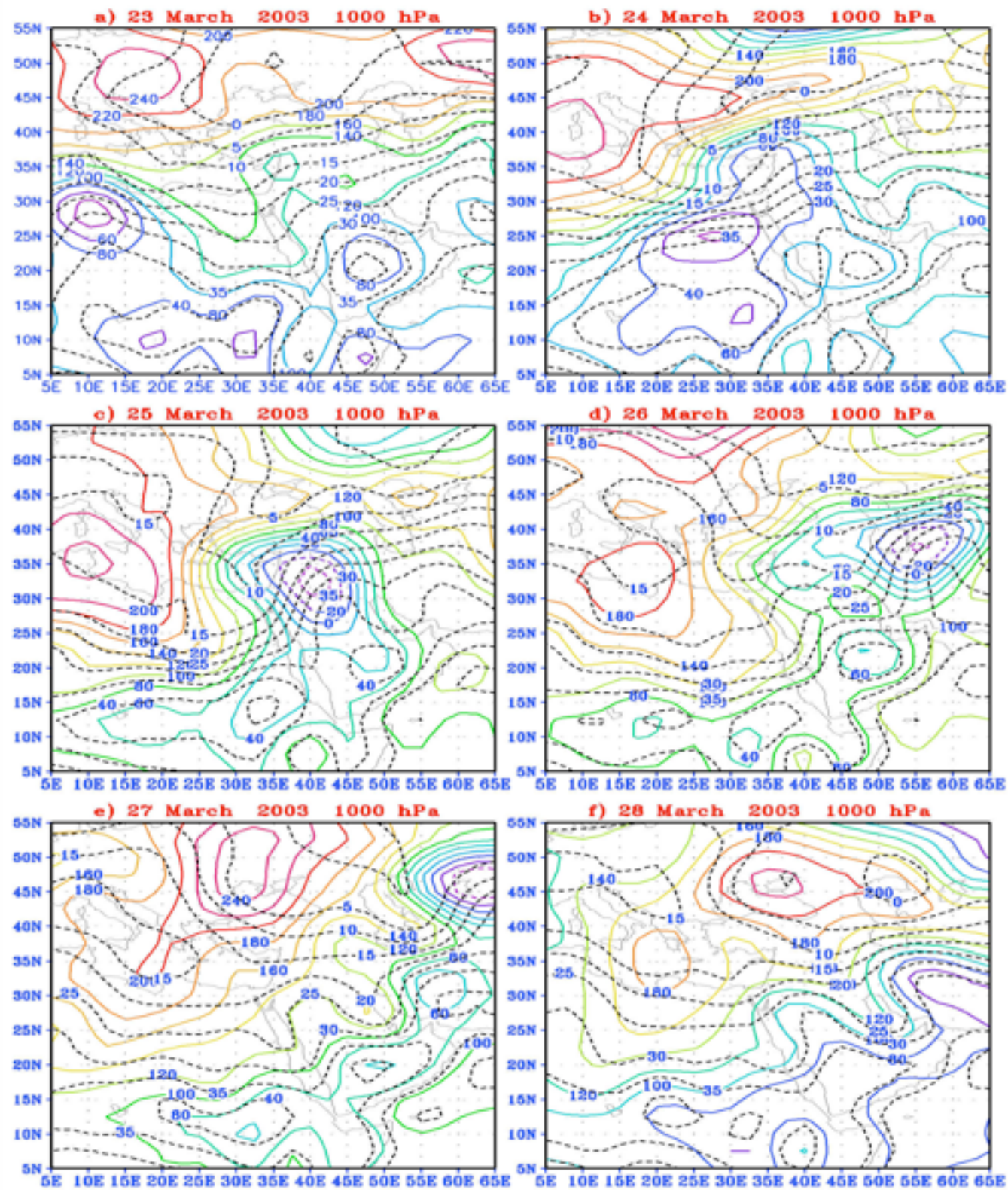
Causes of Extreme Dust Storm

- ① The passage of cold fronts associated with mid-latitudes depressions from west to east.
- ① include a strong gradient in temperature and pressure especially on the north part of the country accompanied by a convergence zone which works to raise the dust particles to the top and then spread in the surrounding areas by wind in the upper.
- ① the passage of Thermal Low coming from North Africa, carrying huge amounts of sand and dust to cover the north of the kingdom, and sometimes up to the center of the the Kingdom.
- ① The low heat on the south-east Egypt (north-eastern Sudan) and with the exiting of strong vertical motion working to raise sand and dust in this region to the upper of atmosphere and then bear strong westerly flow the sand and dust to cover the Red Sea and west of the kingdom.

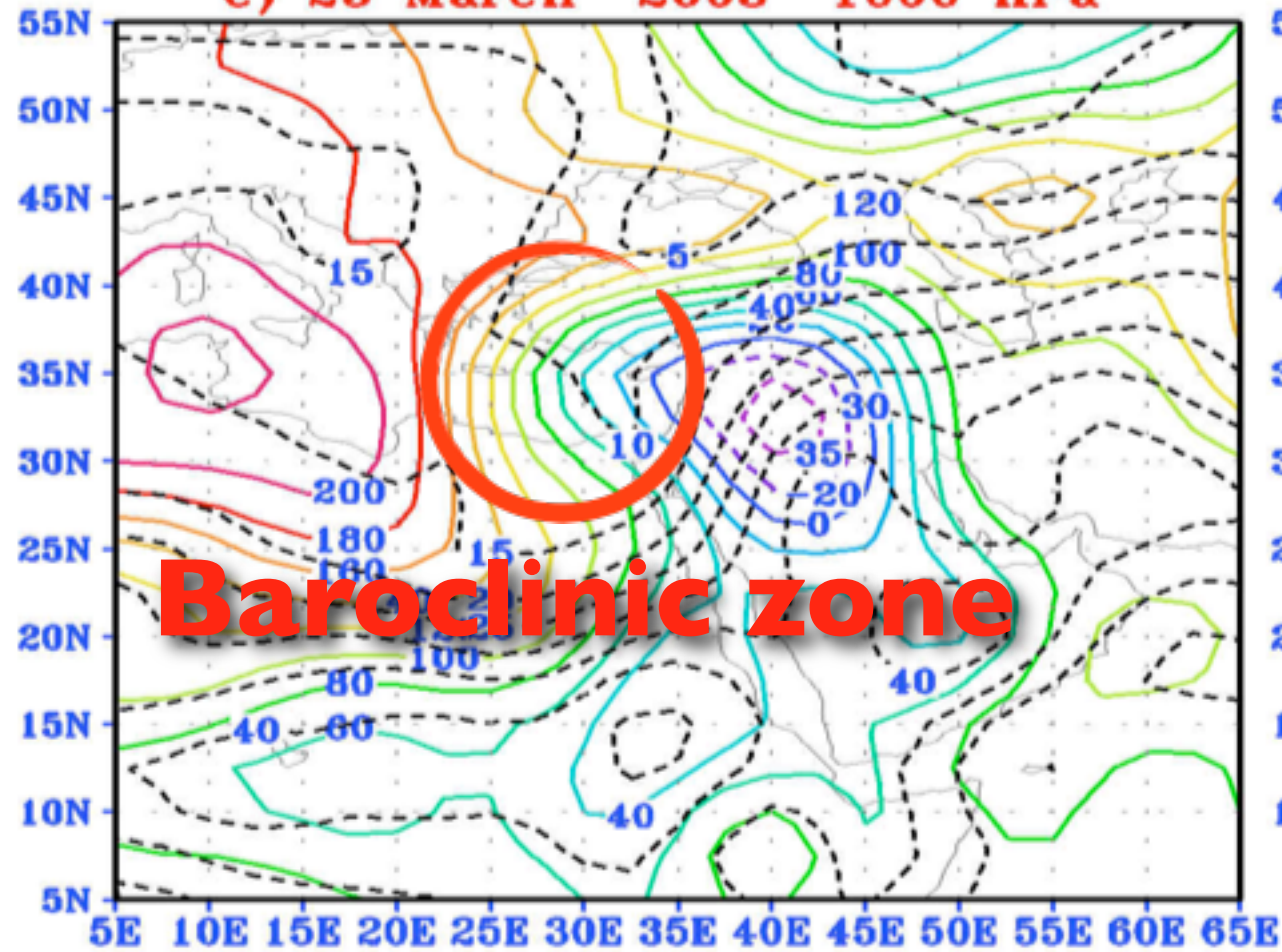
Cases Study

- 25 Mar 2003
- Gap flow
- Yenbo
- PCASP (Under Process)

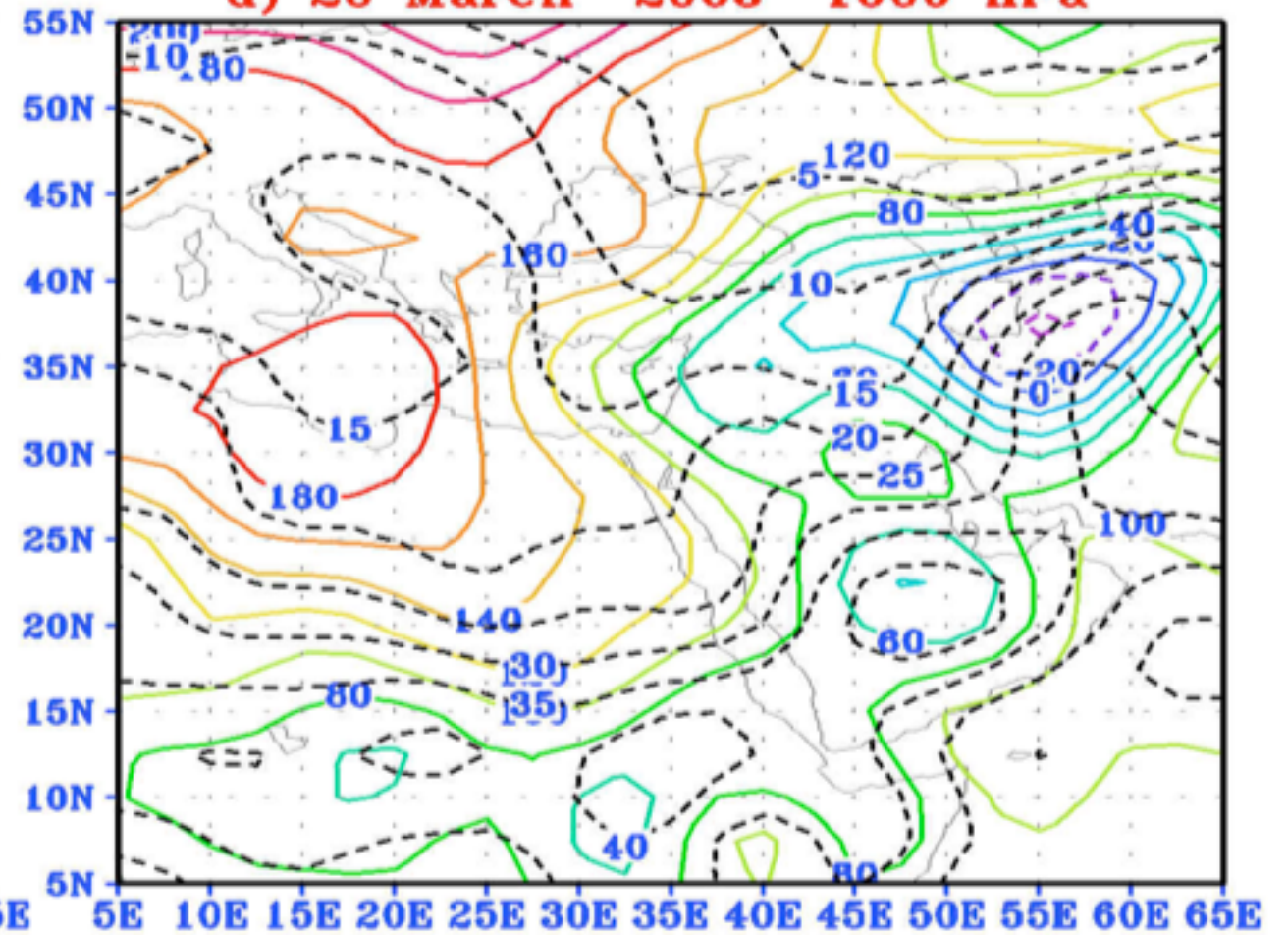
25-26 Mar 2003



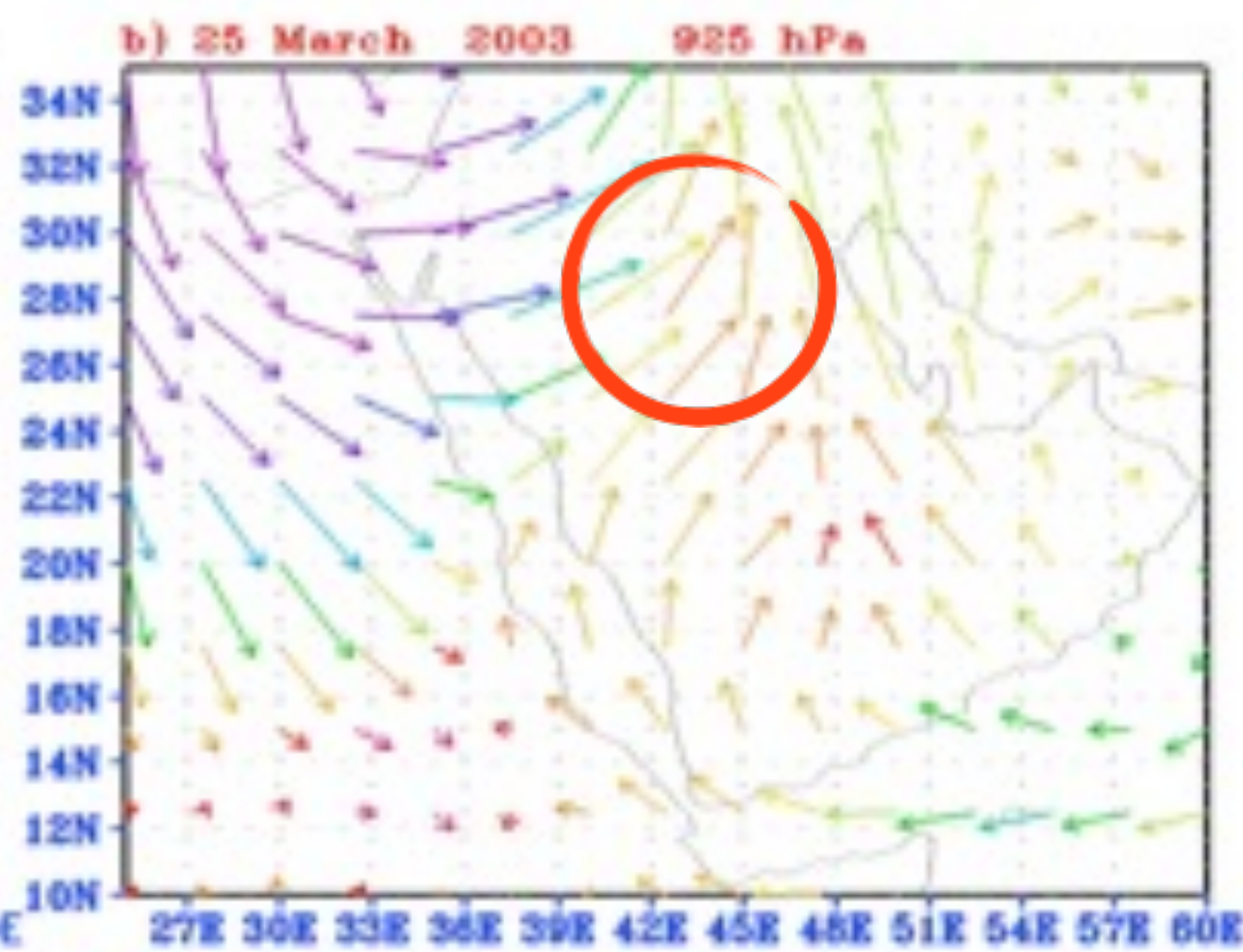
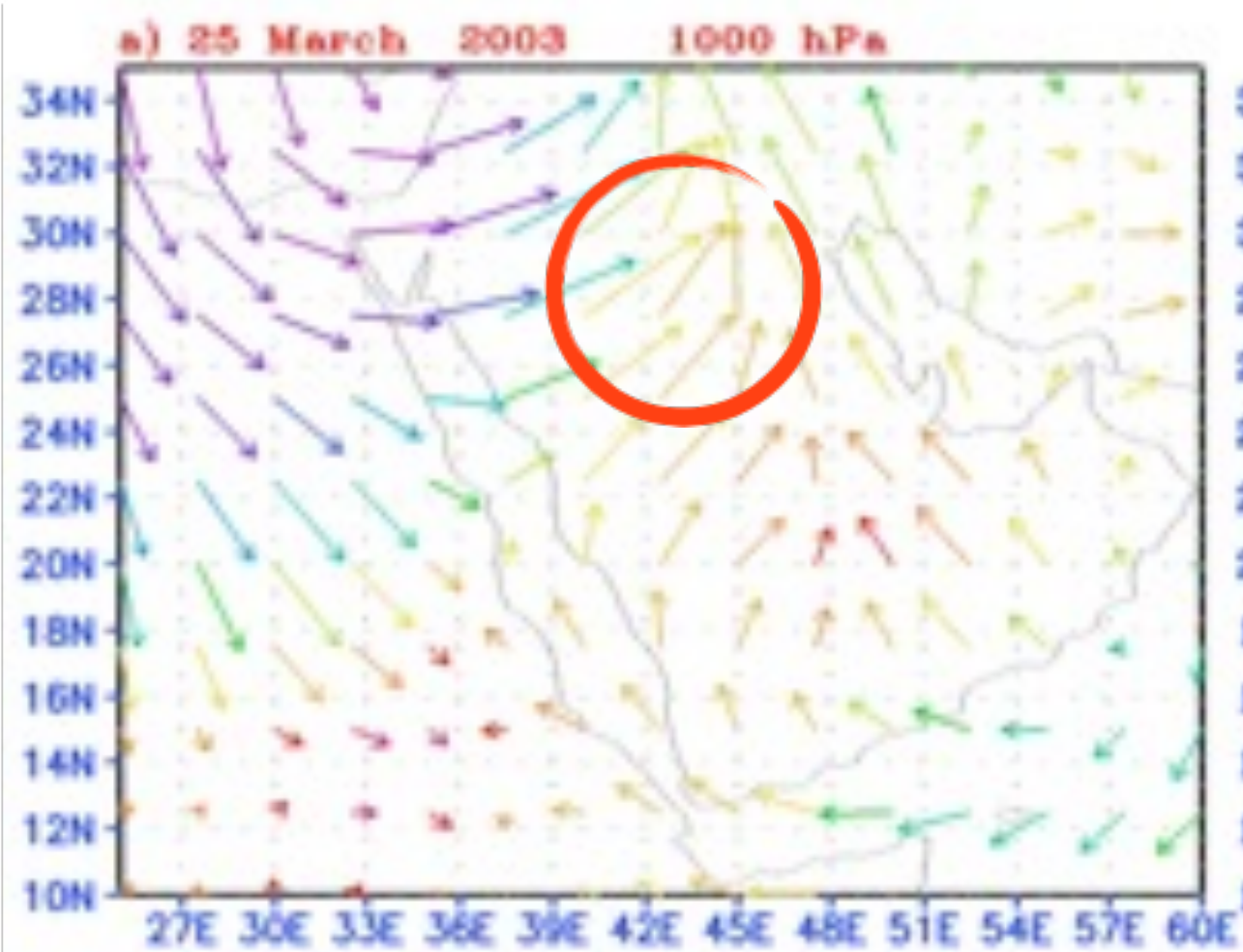
c) 25 March 2003 1000 hPa



d) 26 March 2003 1000 hPa

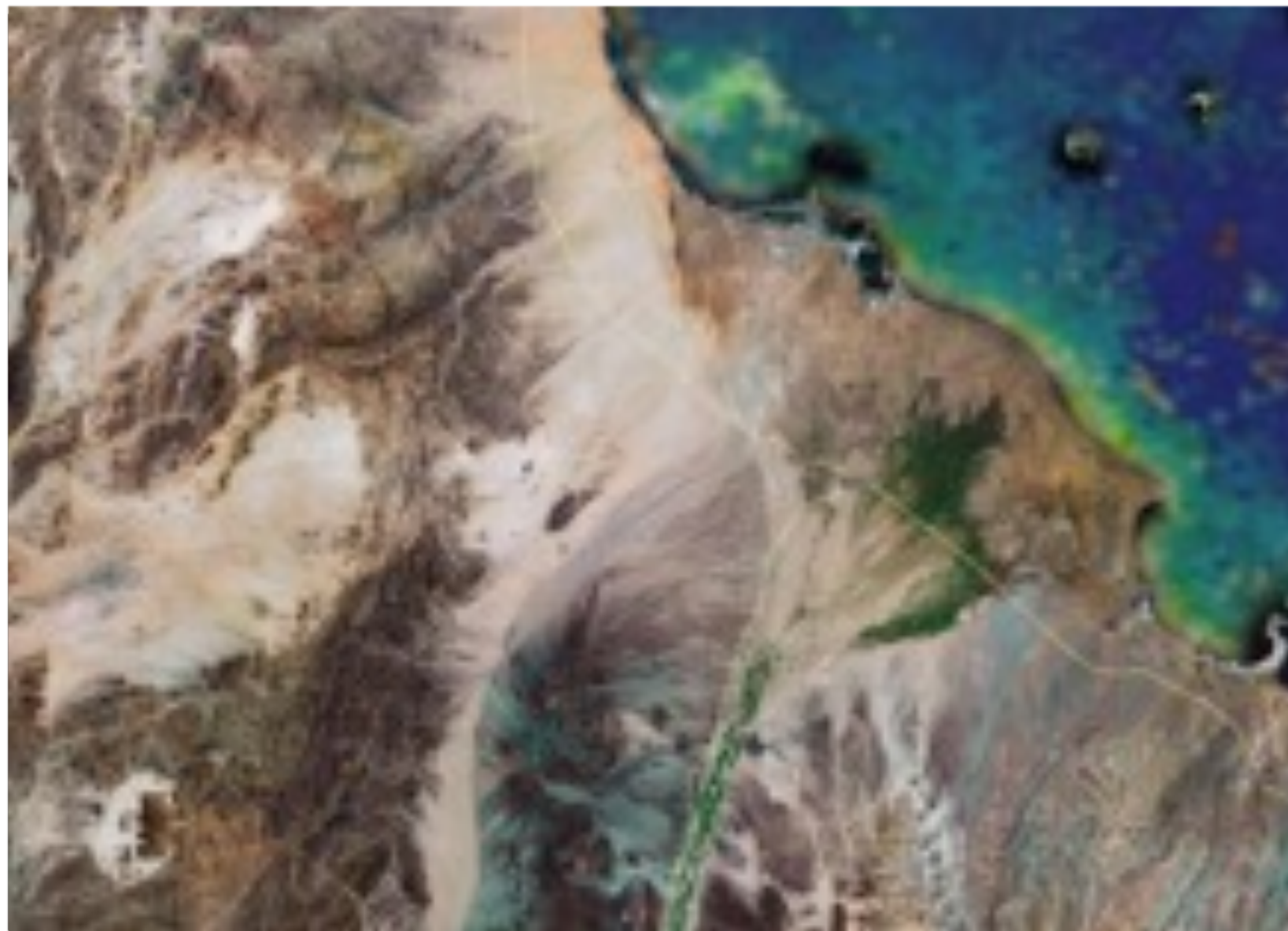


Baroclinic zone



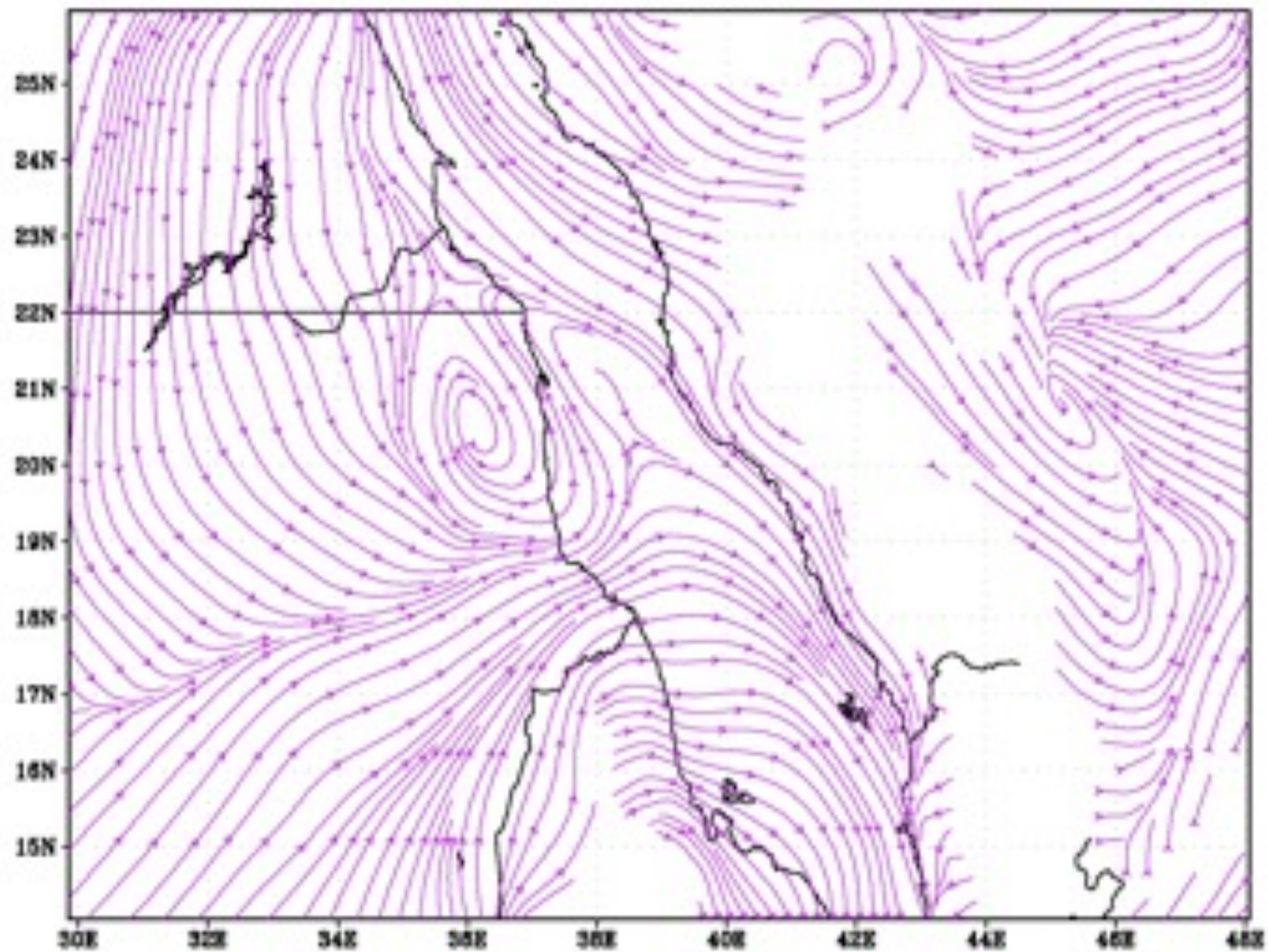
Tokar Gap



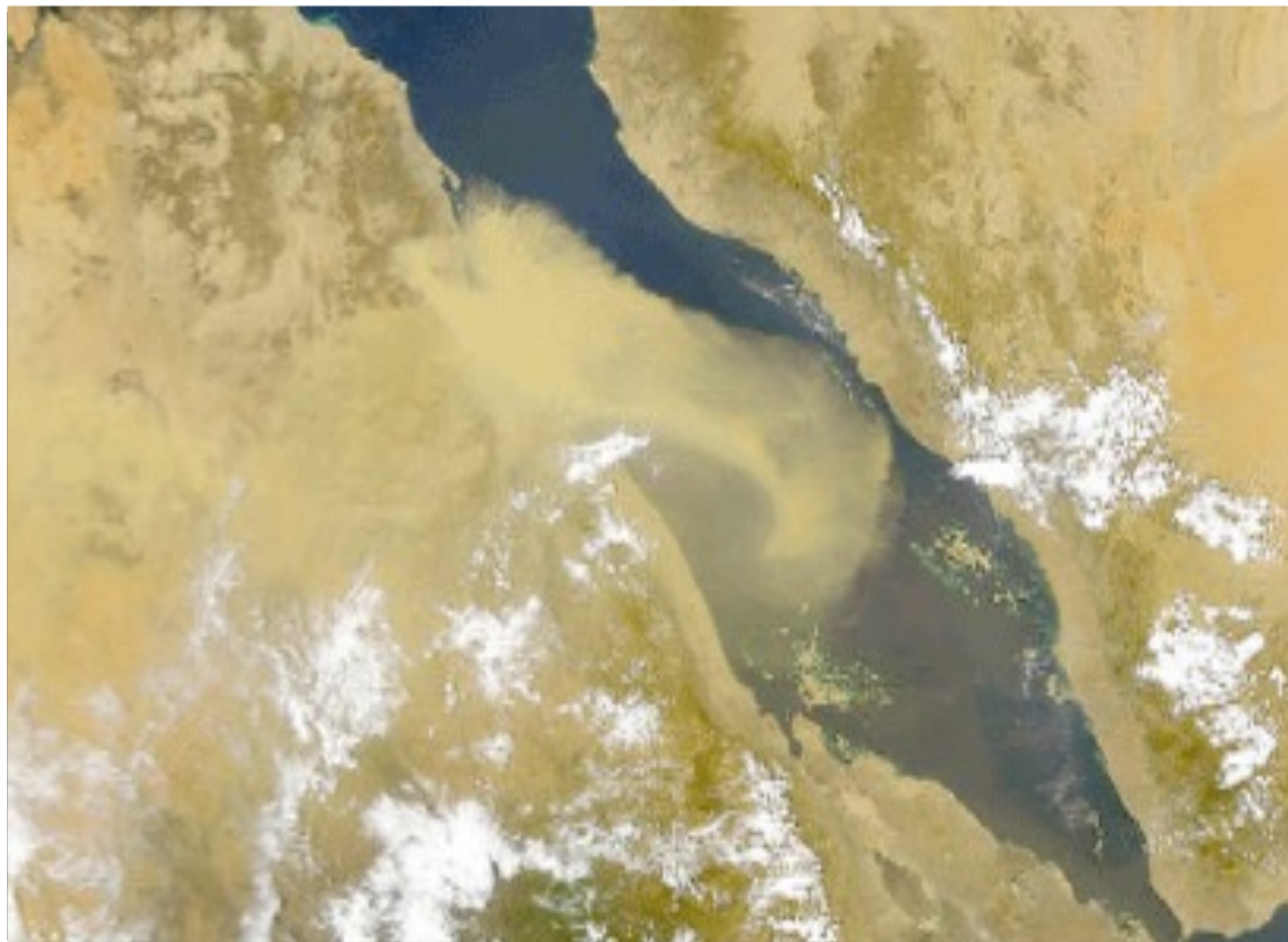


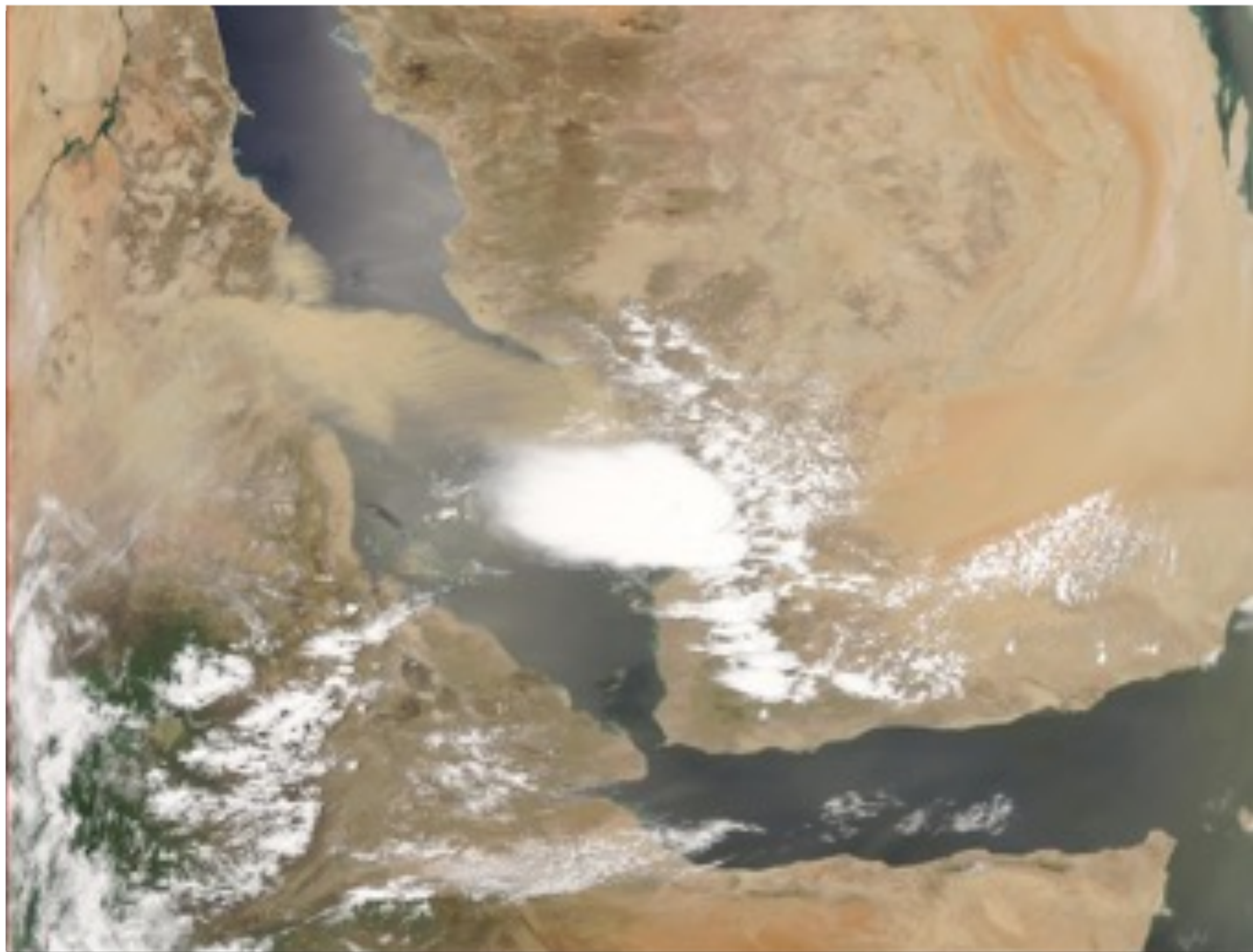
Wed 00Z-09-JUL

Level 900.000 h



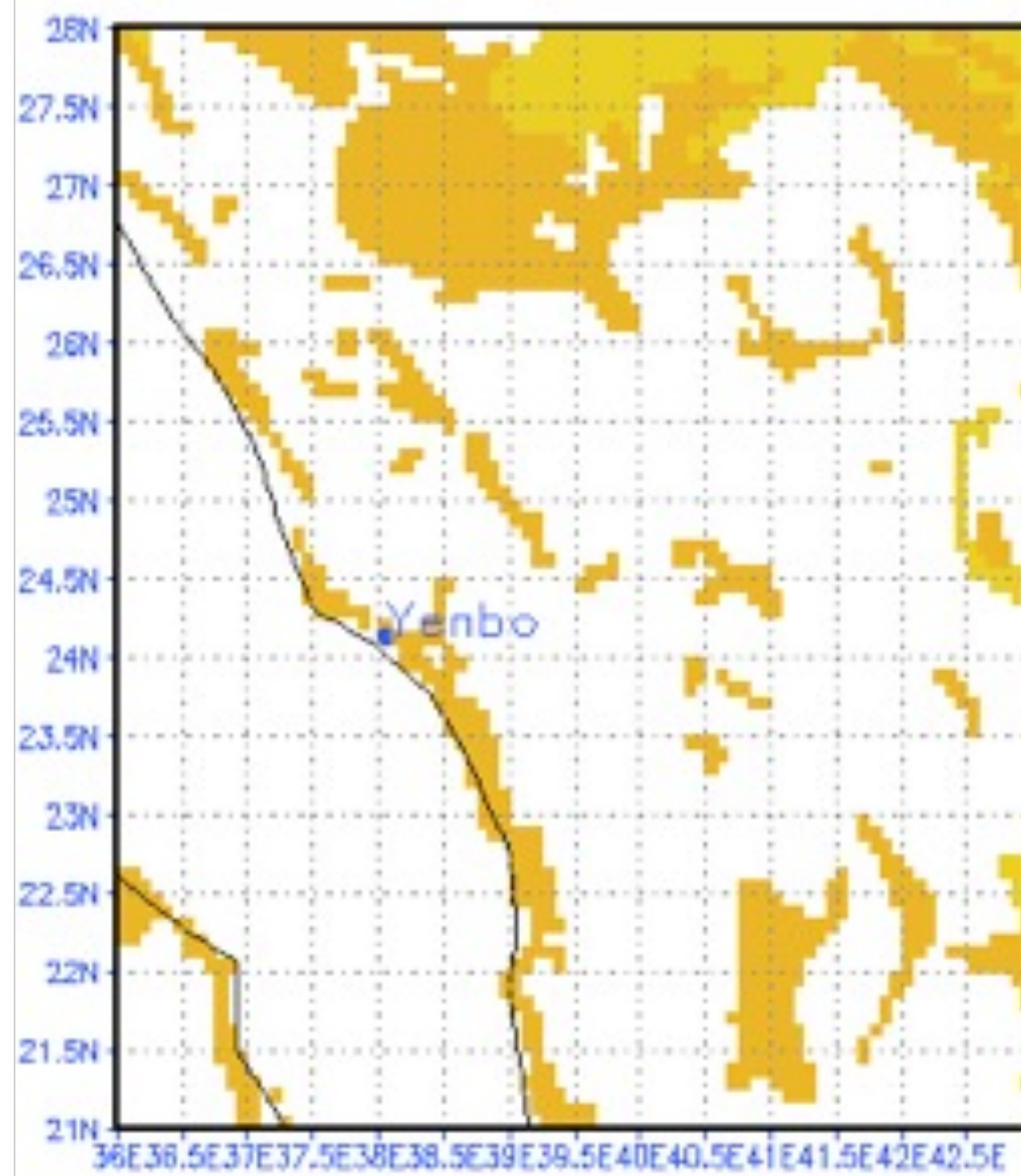
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[ABOUT](#)





Yenbo





Yenbo

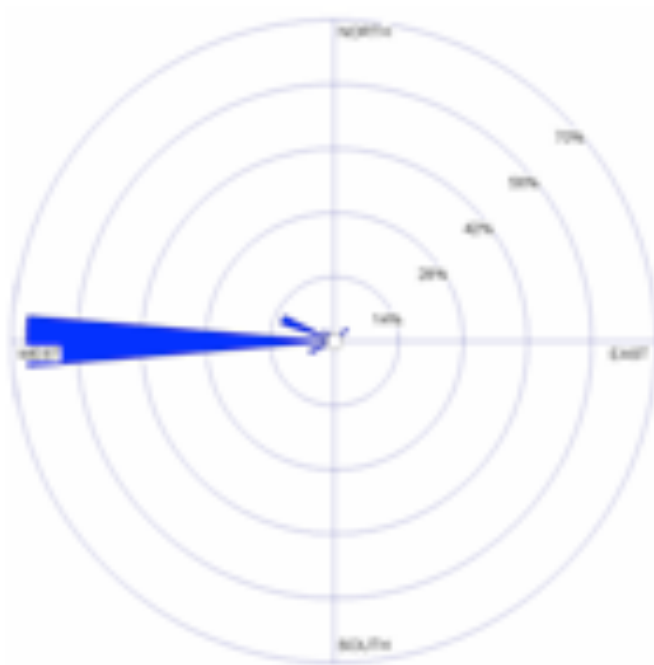
10

38.05

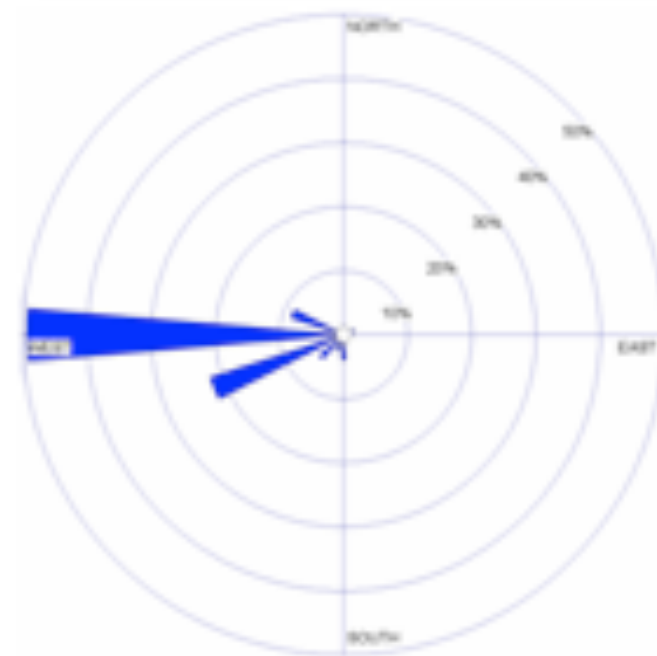
24.14

1978-2006

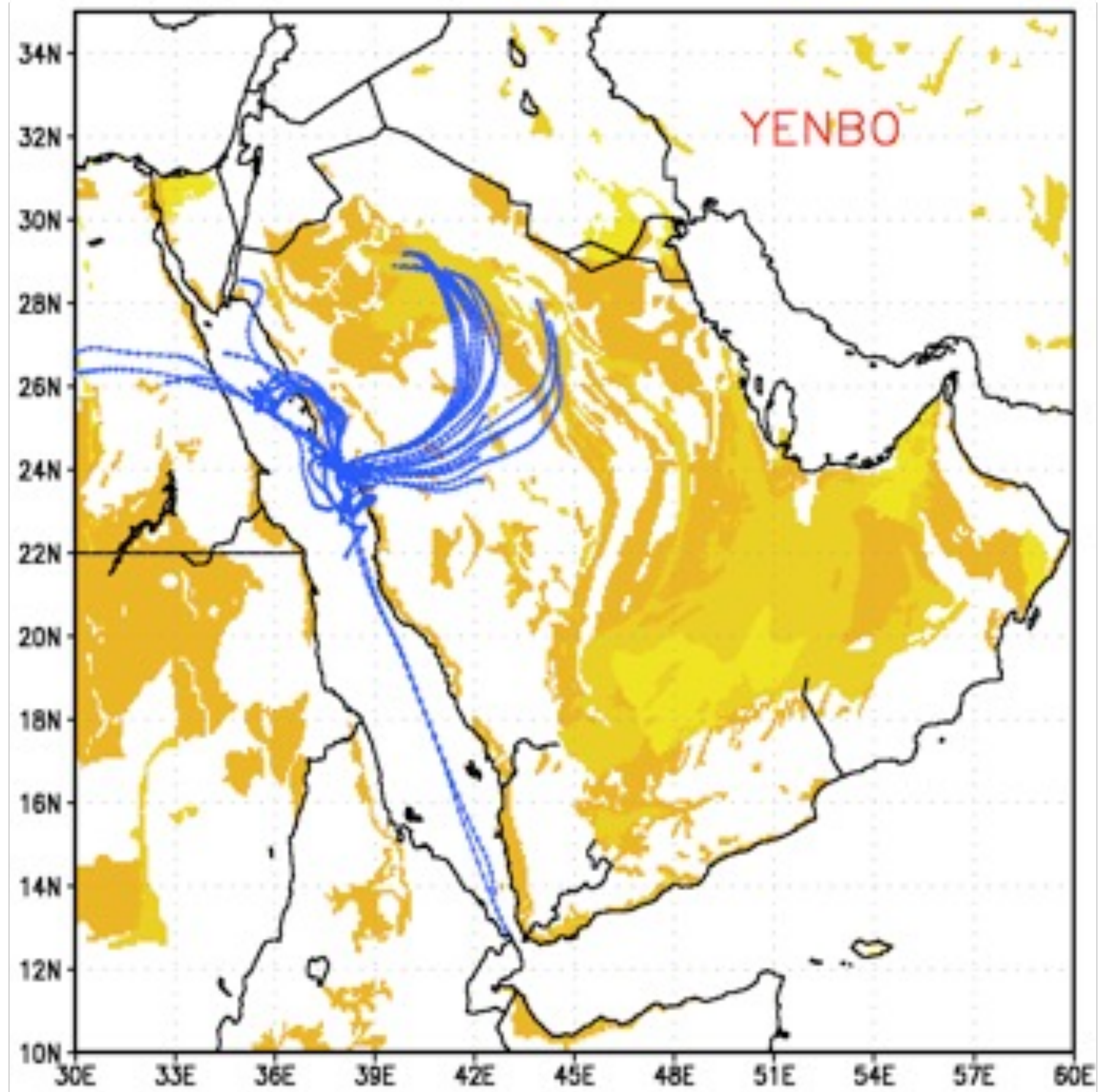
Yenbo



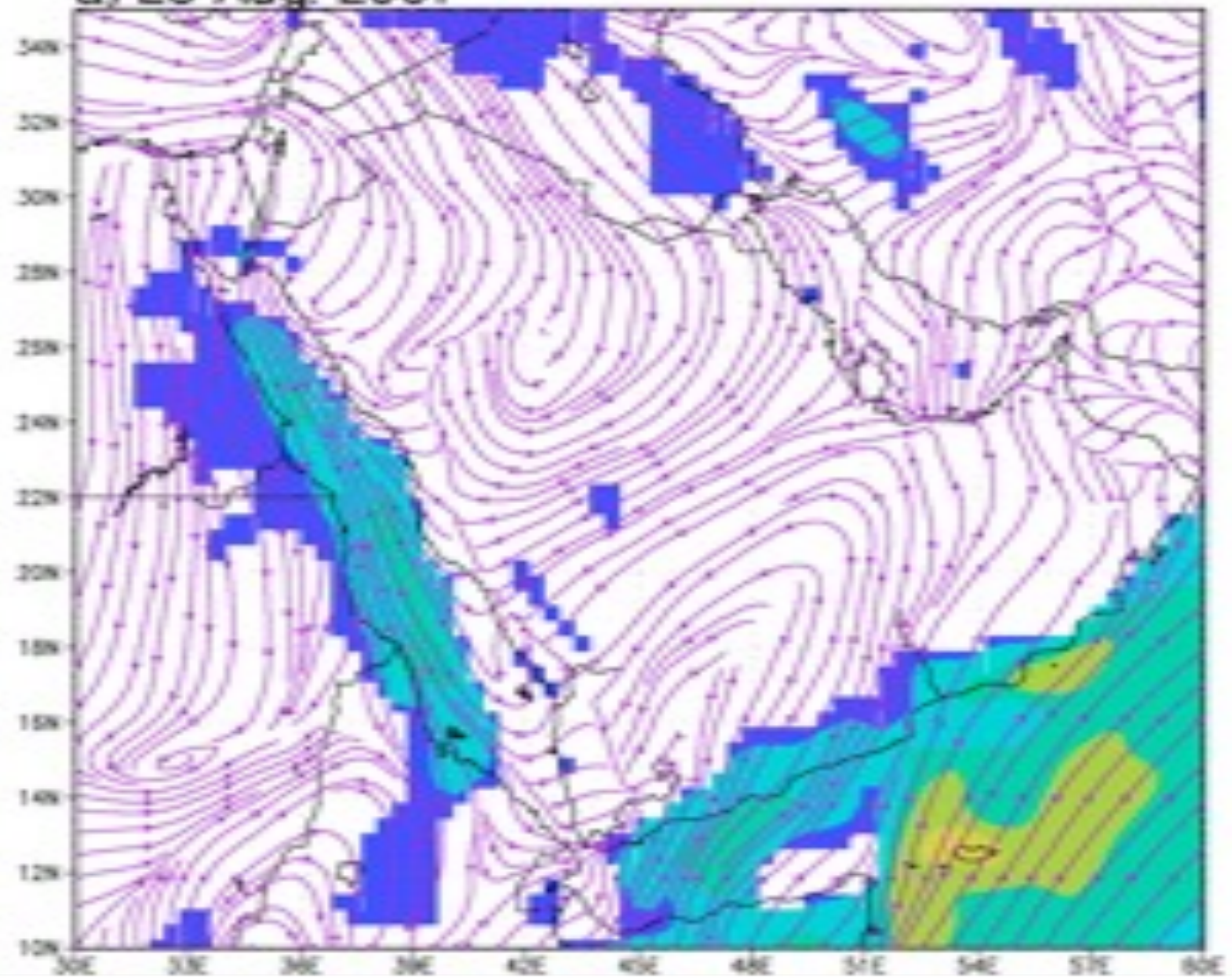
WIND SPEED
(m/s)
1-10
11-20
21-30
31-40
Data: 10 years



WIND SPEED
(m/s)
1-10
11-20
21-30
31-40
Data: 10 years



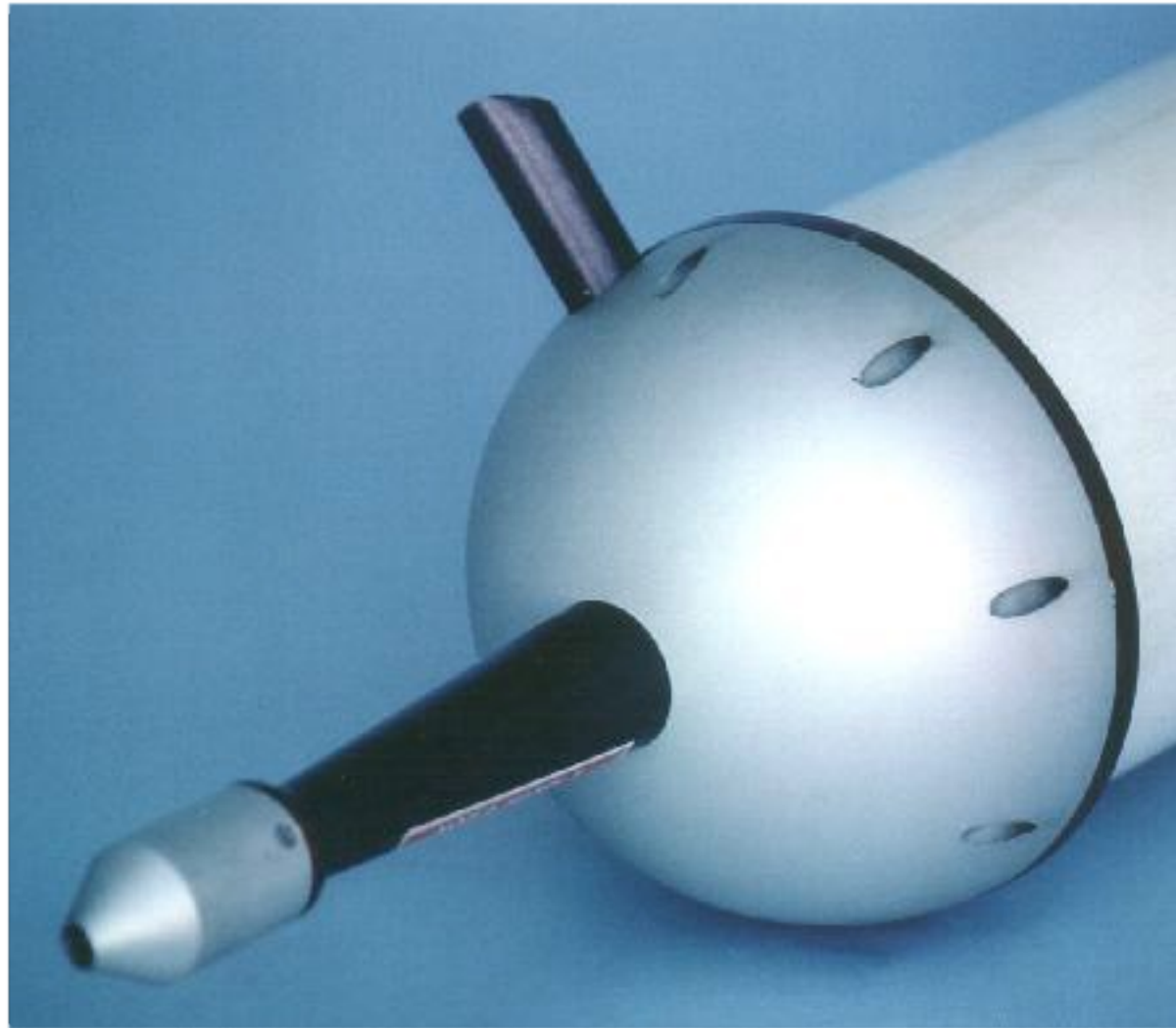
a) 25 Aug. 2001





PCASP

Pcasp



The Passive Cavity Aerosol Spectrometer Probe (PCASP) Model 100 is an instrument developed by Particle Measuring Systems (PMS Inc., Boulder, Co) for the measurement of aerosol particle size distributions. This sensor is utilized in studies of troposphere chemistry and aerosol physics.

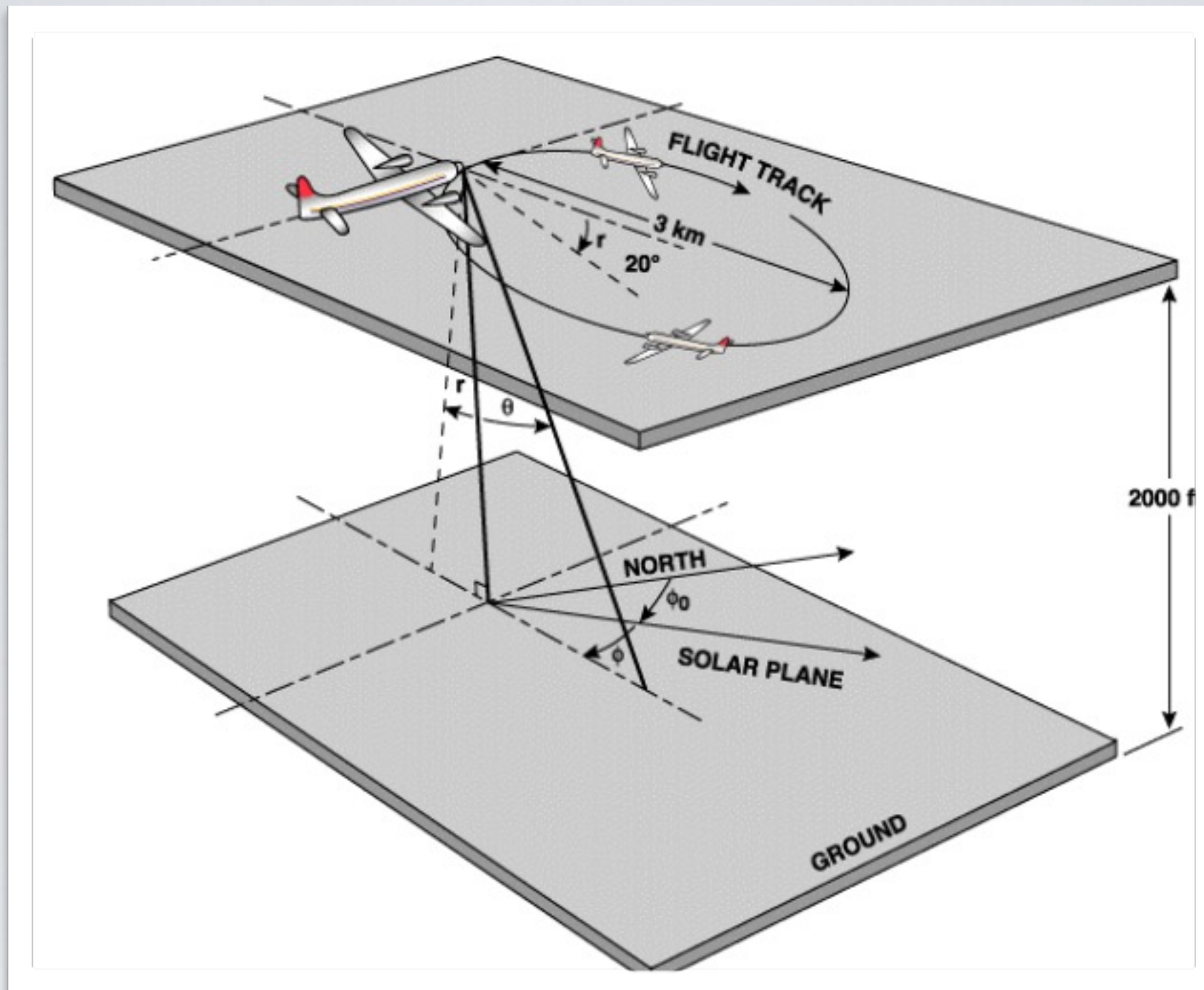
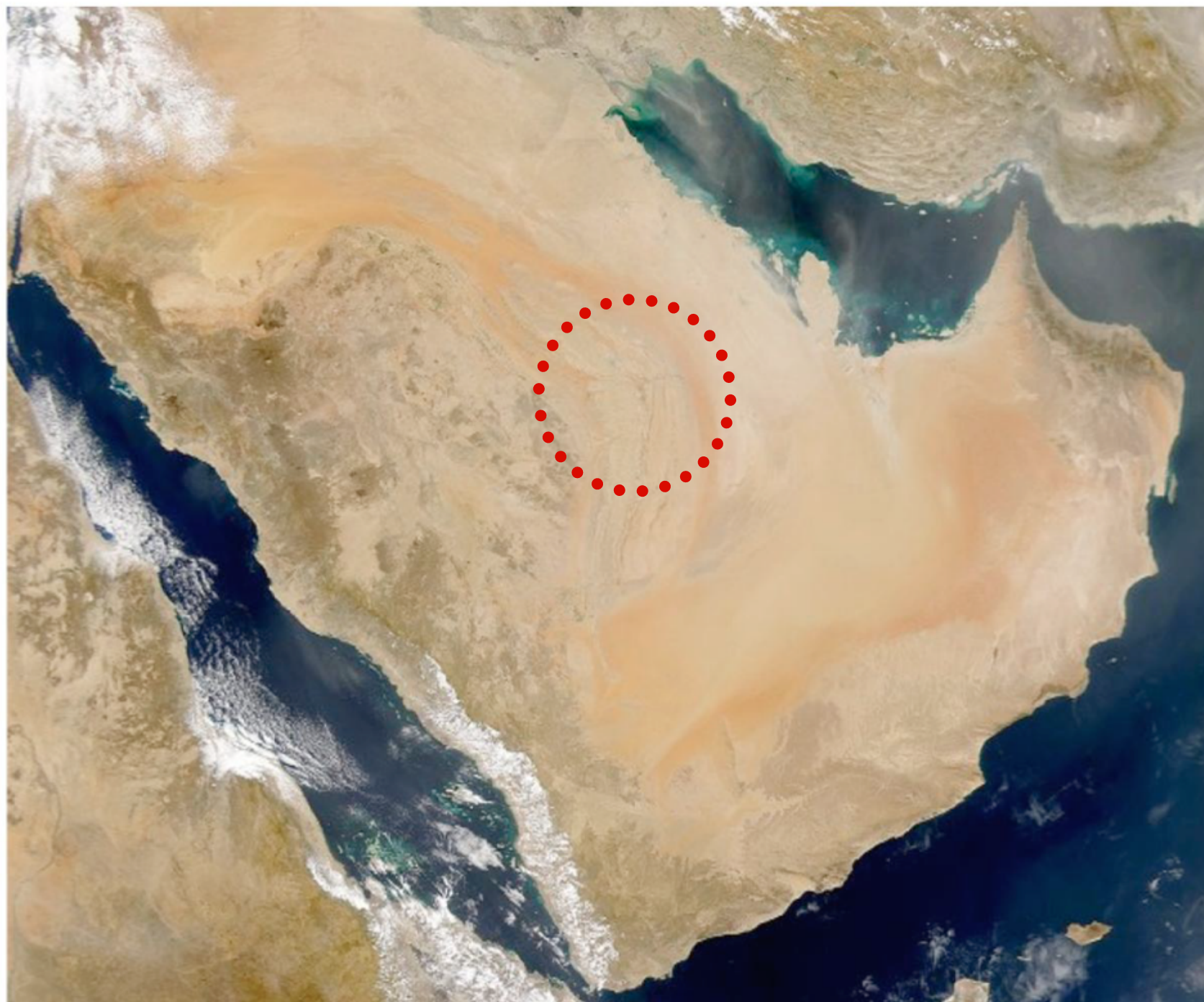
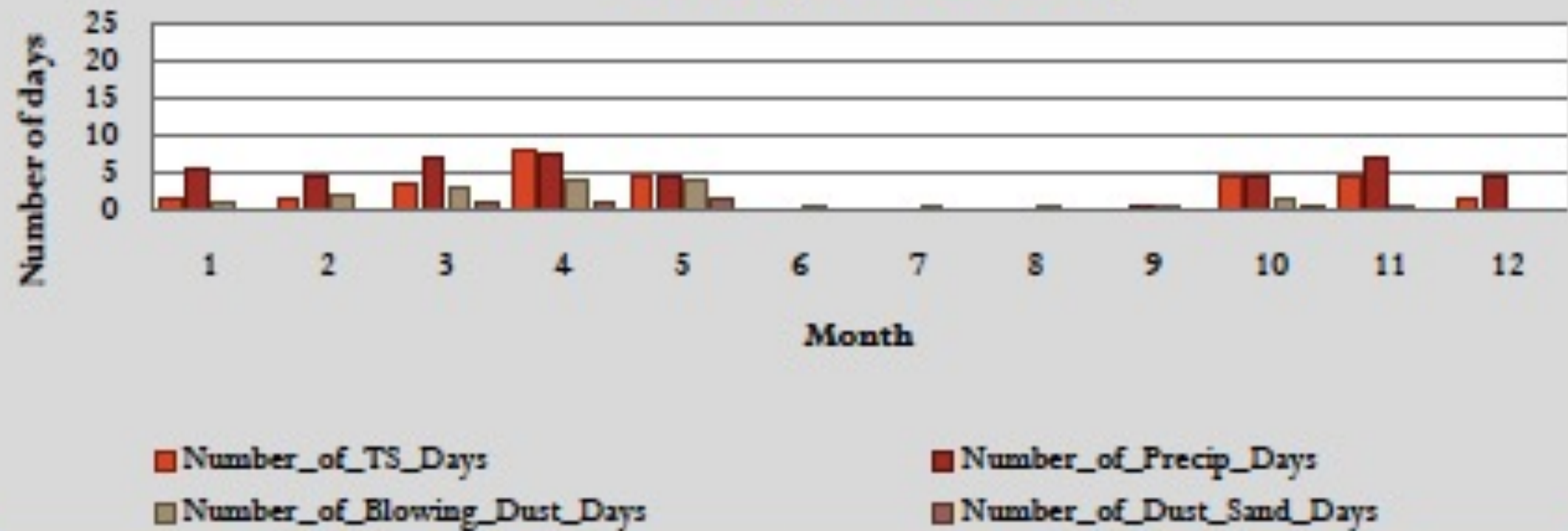


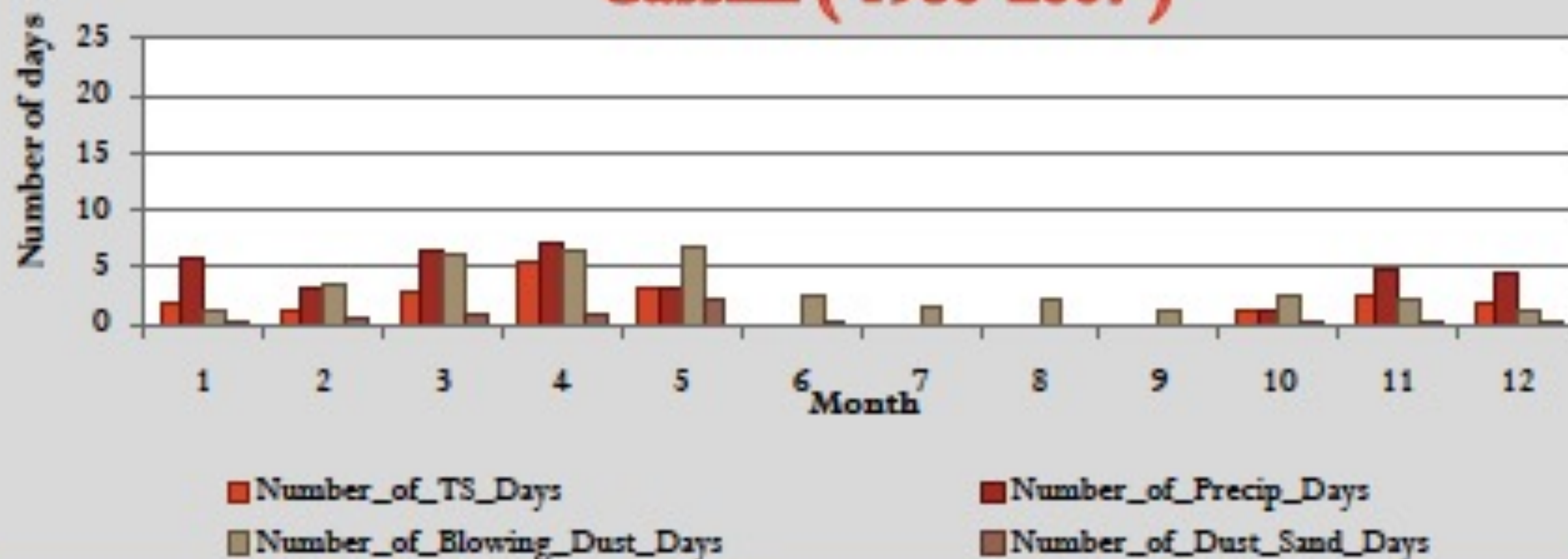
Figure shows a typical flight pattern whereby the aircraft, with the CAR in the nosecone, flies a clockwise circular pattern above the surface or cloud repeatedly, drifting with the wind, and scans the underlying surface and much of the transmitted solar radiation from above, and makes radiometric observations about every 1° in azimuth and better than 1° in zenith angle with an instantaneous field-of-view of 1° . Often, multiple circular orbits are averaged together to smooth out the reflected solar radiation signal.



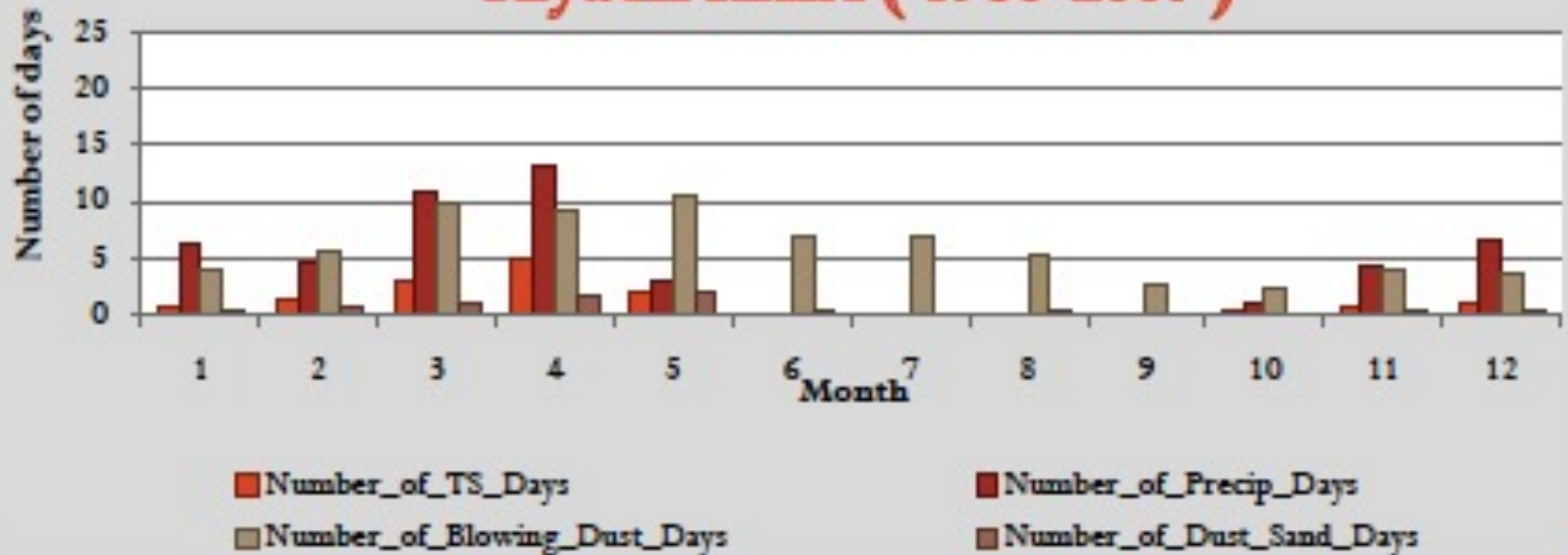
Number of weather events days Hail (1980-2007)



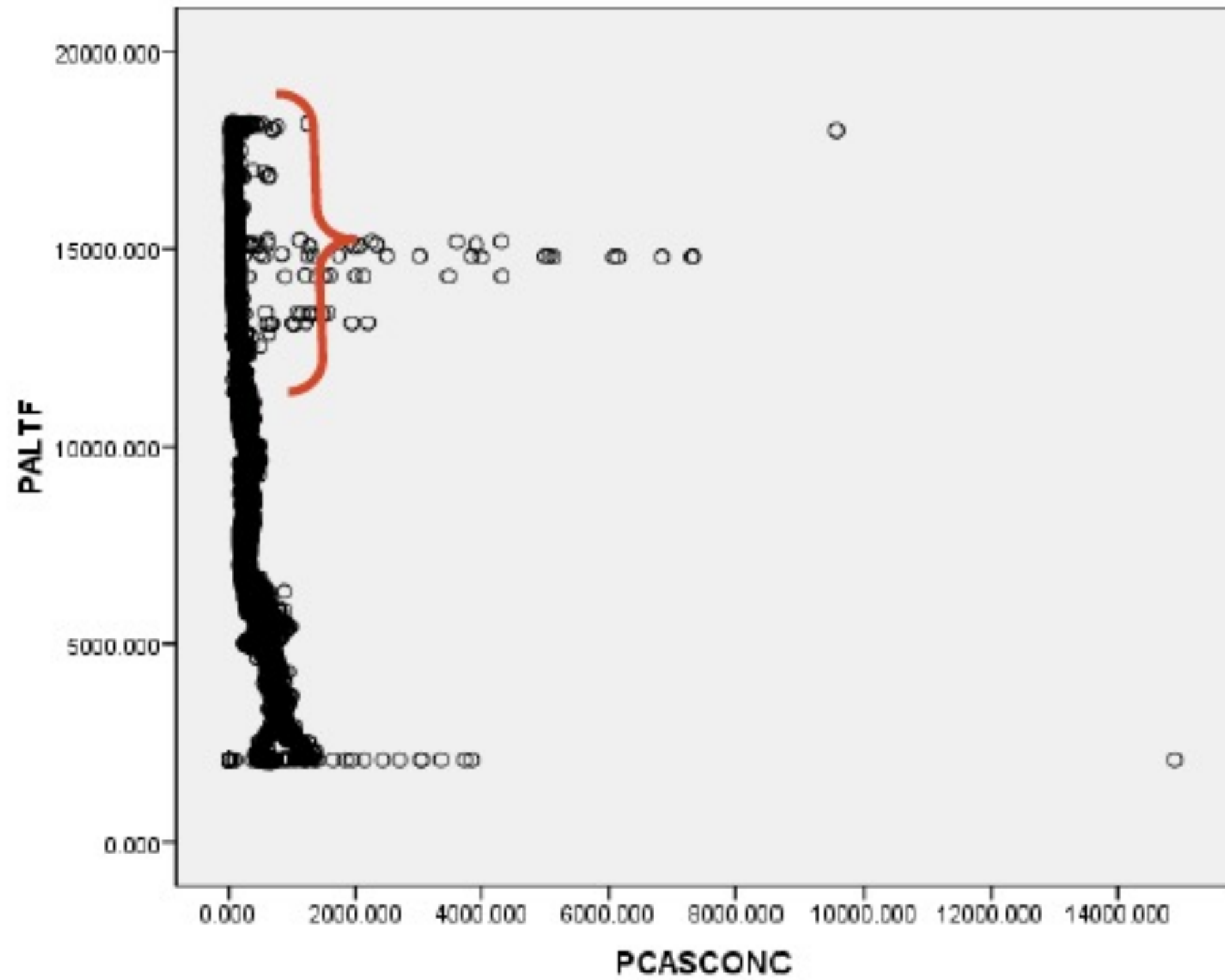
Number of weather events days Gassim (1980-2007)



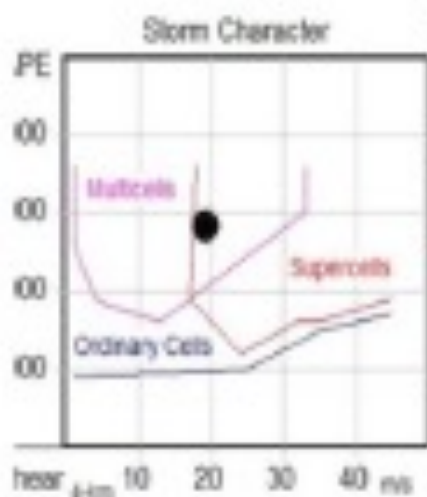
Number of weather events days Riyadh KKIA (1980-2007)



11-04-2007



Reob Data	
Pres:	
Hgt:	
Temp:	
Td:	
Tmax:	
Wind:	
Hgt:	



Conclusion

- We note that the high concentrations of Aerosols followed by an indication of the cloud .
- The level where the high concentrations in the same level , which is formed by the clouds
- The identification of level with a high concentration determines whether it is sowing the way through the clouds, or a peak
- there are Strong relationship between high concentrations and is a drawing showing that the withdrawal of the Kingdom of the kind of dirty clouds.
- Increasing in relative humidity its effect in PCASP counting.

Question?