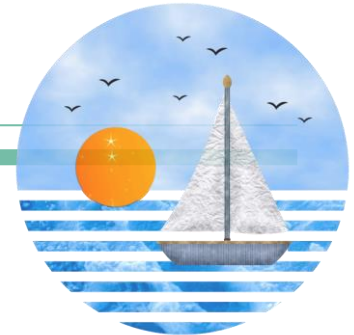

Oman summer weather

— Marine Meteorological Course for Royal Oman Navy —

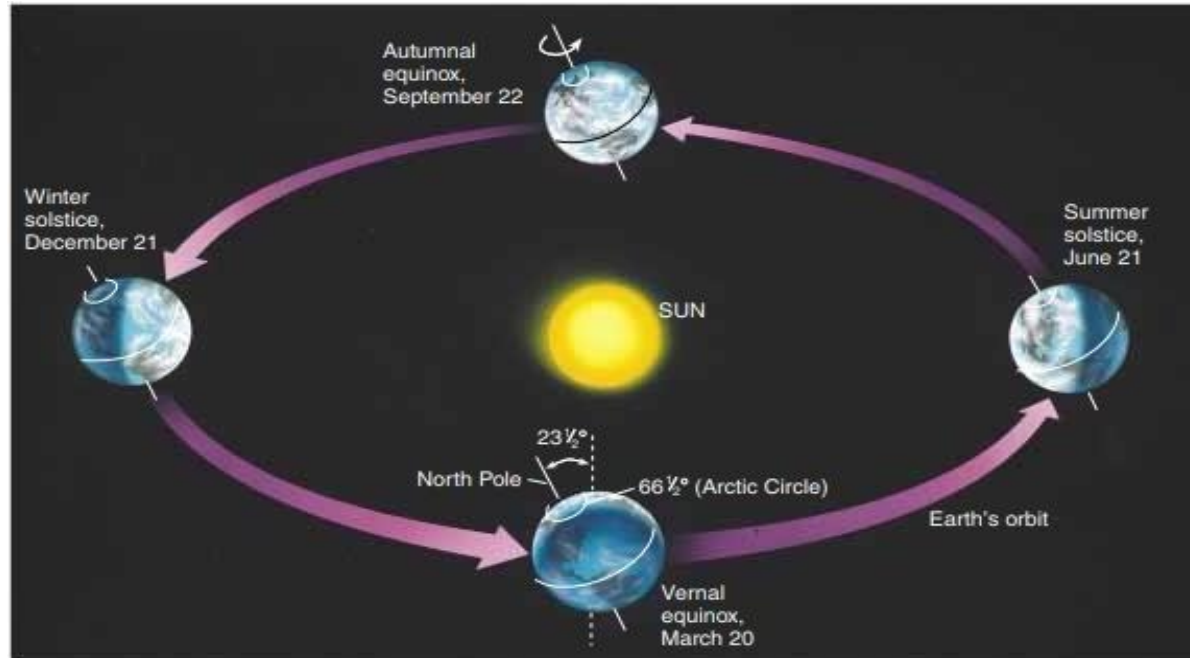
Lecturer: Bushra Al Saadi, Meteorologist



Content

- Why we have seasons on earth?
- Air masses affecting Sultanate of Oman
- Cloud formation
- Convection clouds(local)?
- Monsoon

Why we have seasons on earth?



The Seasons

2nd transitional
period

From 22nd September to 20th
December

Summer

21st June to 21st September

Winter

21st December to 21st March

1st transitional
period

From 22nd March to 20th June

Subject 1:

Air masses affecting Sultanate of
Oman

- Air masses
- Air masses influence Sultanate of
Oman Climate

Subject 1: Air masses

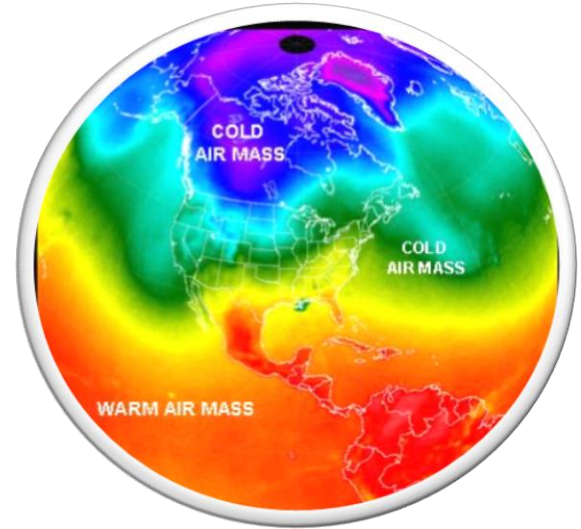
- **Air masses are...**

A large body of air sits over an area of land or water for a long period of time, it will take on the characteristics of the land or water beneath it.

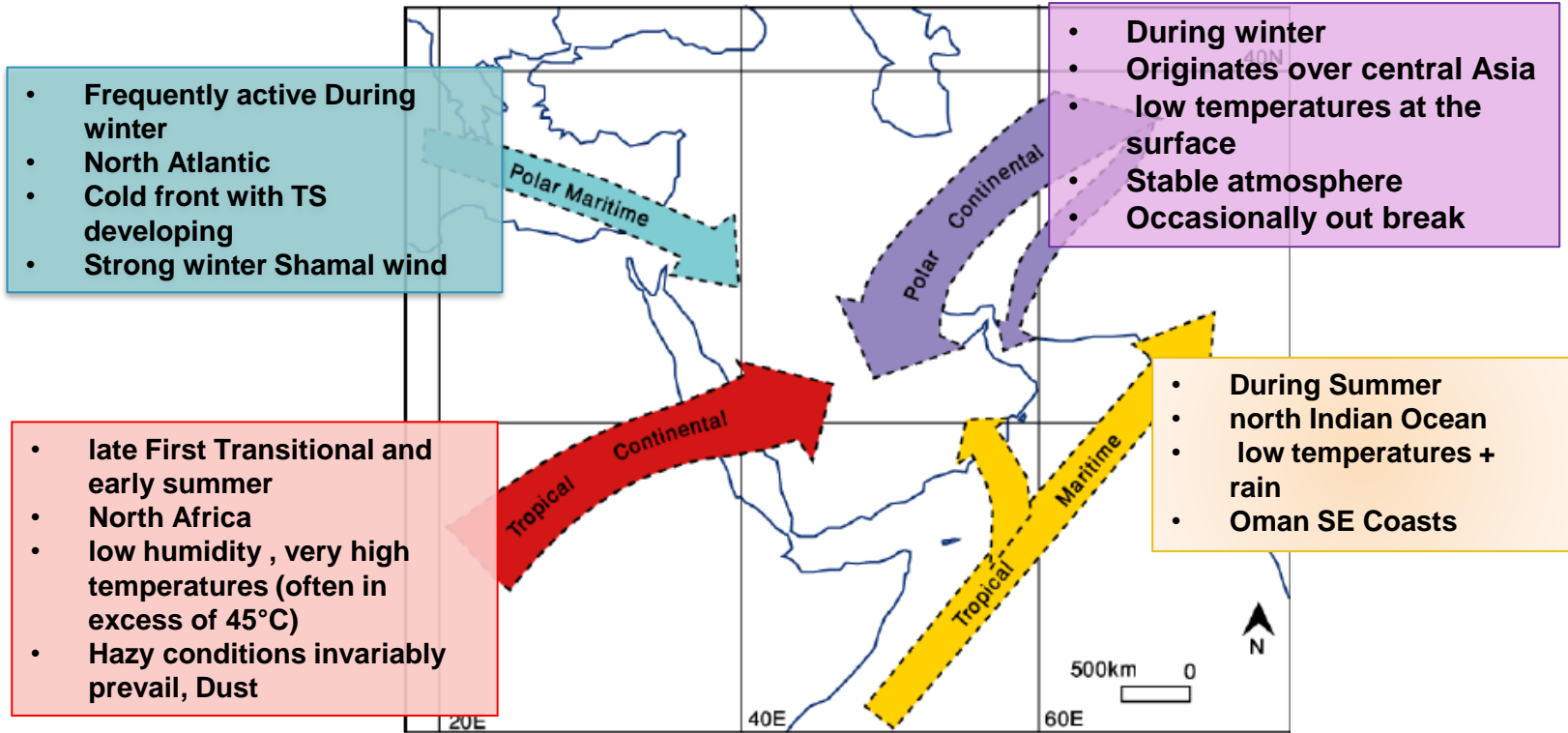
- **Named for their SOURCE REGION**

- Continental (c)
- Maritime (m)
- Arctic (A)
- Polar (P)
- Tropical (T)

- When Air Masses move they bring their temperature and humidity to new areas.



Subject 1: Air masses influence Sultanate of Oman Climate:



Subject 2:

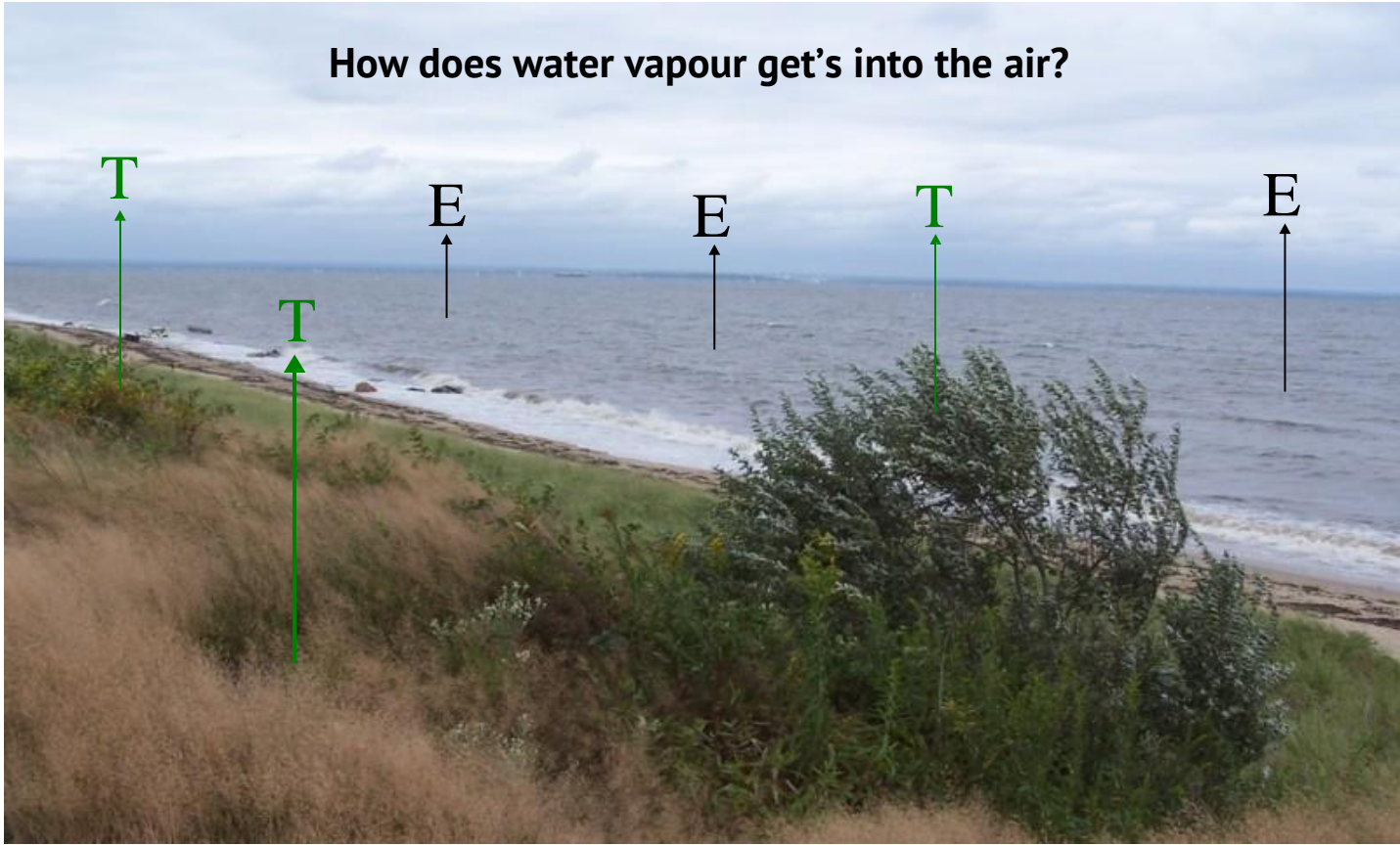
Cloud's formation

- Ingredients needed for cloud to form
- How does water vapour get's into the air?
- Cloud formation mechanism

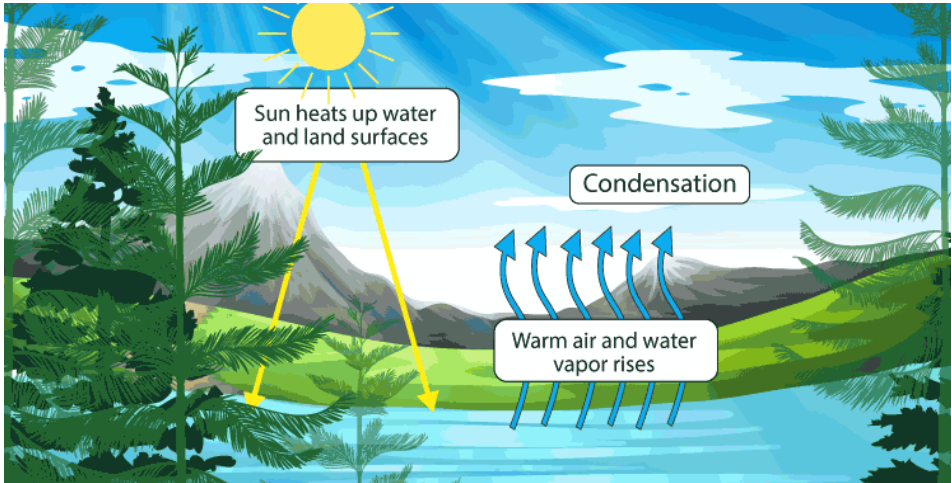
Subject 2: Ingredients needed for cloud to form

- 1 Water vapor (water as a gas)
- 2 Conditions favoring the change of state (from gas to liquid or ice)
- 3 A flatter surface for water vapor to condense on (condensation nuclei)

How does water vapour get's into the air?



Subject 2: Cloud formation mechanism



Air rises and the water vapour within it cools.

water vapour collides with and sticks to tiny particles floating in the air - condensation nuclei forms- which include aerosols such as salt and dust.

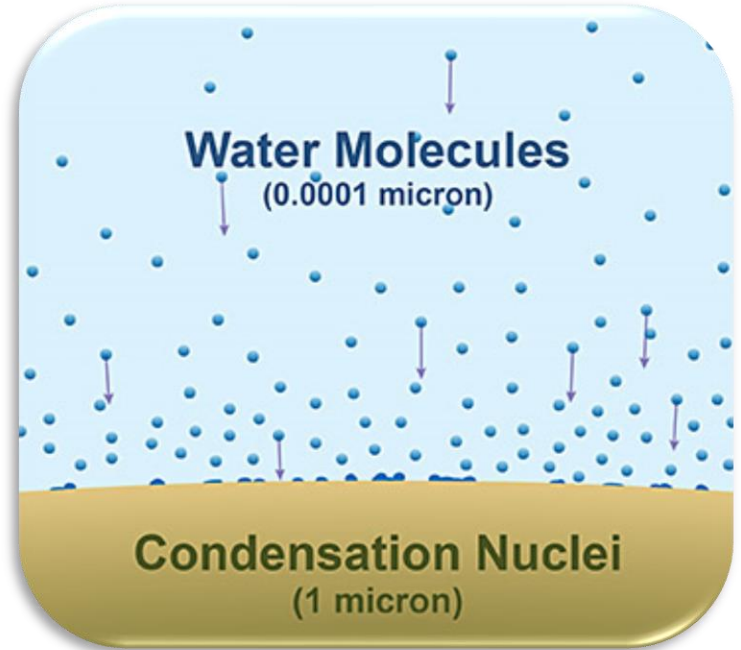
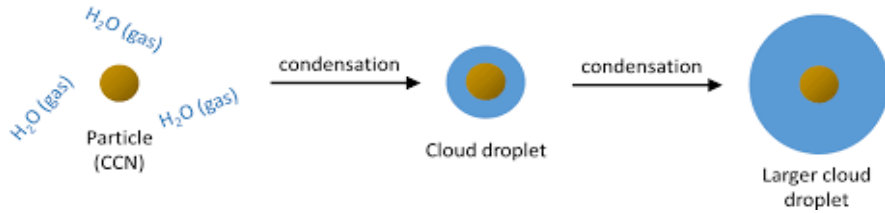
As vapour rises and cools, these nuclei provide the surface for the vapour to condense onto.

When enough vapour condenses around the nuclei, a cloud droplet is formed.

Then combined to make a cumulus cloud.

Sometimes these water droplets combine to become larger drops or crystals.

If they become large enough and too heavy, they will gradually fall from the sky as " precipitation".



Subject 2: What causes the air to rise?

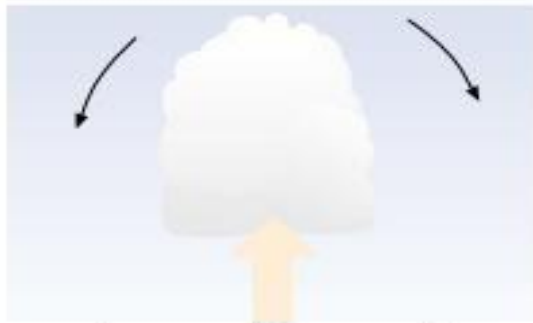
The sun – The sun heats the ground, which then heats the air just above it, causing it to rise upwards in the sky (warm air rises). This tends to produce cumulus clouds.

Hills and mountains - When air is travelling towards a mountain or hill, it cannot go into the hill and so it rises upwards along the terrain. Stratus clouds are often produced this way.

Weather fronts - A weather 'front' is where warm air meets cold air. The warm air rises up and over the cold air (warm air rises). This produces nimbostratus clouds, amongst others.

Convergence - Streams of air flowing towards each other from different directions are forced to rise when they meet, or converge. This can cause cumulus cloud and showery conditions.

Turbulence - A sudden change in wind speed high up can create circulations in the air which can bring the air at the surface high up into the sky.



5 km
Convection
(a)



150 km
Topography
(b)



500 km
Convergence of air
(c)



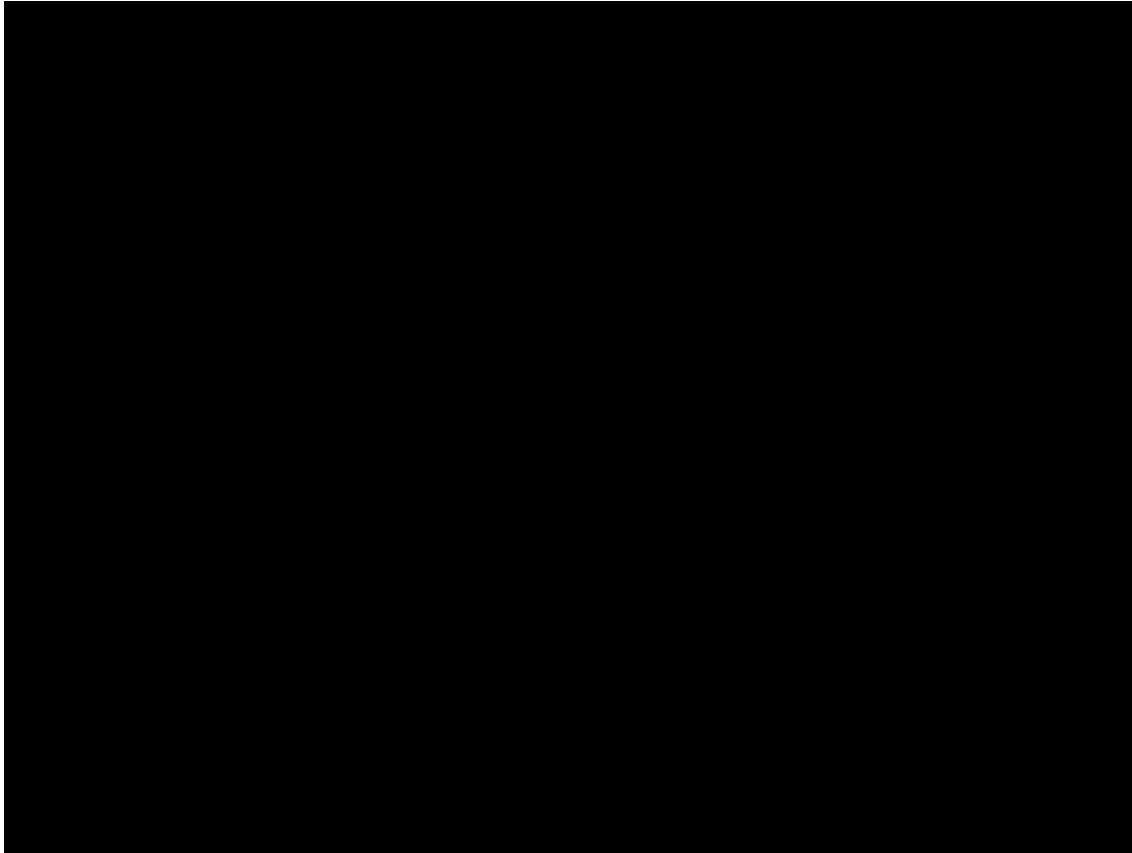
1500 km
Lifting along weather fronts
(d)

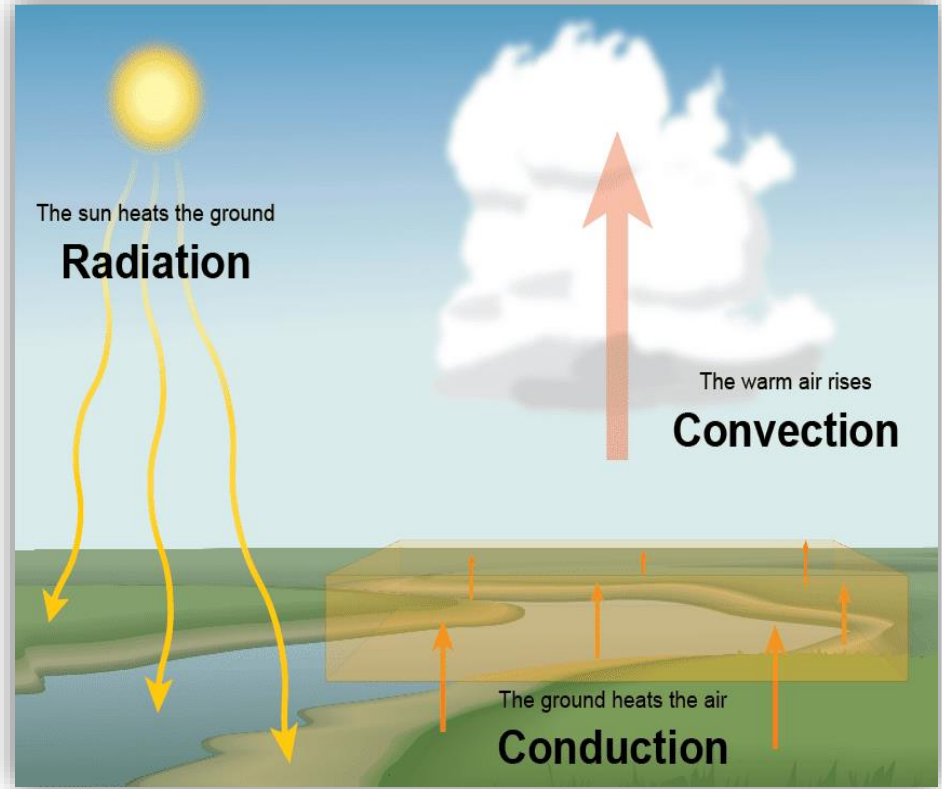
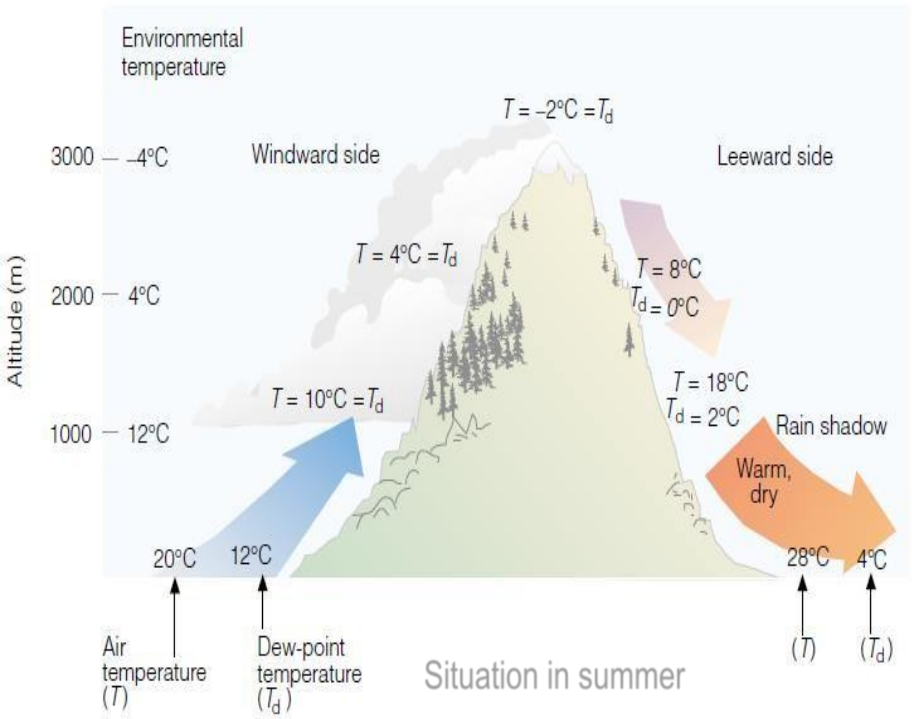
Subject 3:

Convection cloud

- How convection clouds form?
- 26th – 28th June 2022(Local event)
- 28th July 2023(Local event)

How convection clouds form?





26th – 28th June 2022

CAA
الأرصاد العمانية @OmanMeteorology · Jun 26

⚠️ تنبيه:
استمرار فرص تشكل السحب الركامية وهطول أمطار رعدية مصحوبة برياح هابطة نشطة على جبال الحجر والمناطق المجاورة اليوم ومن المتوقع أن يزداد نشاط السحب هذا الأسبوع على جبال الحجر تدريجياً ابتداءً من يوم الغد

4 49 154

CAA
الأرصاد العمانية @OmanMeteorology · Jun 26

الأماكن المحتملة للأمطار و للرياح الهابطة اليوم بالأستدلال بالتماذج العددية العمانية



18 72

← Tweet

CAA
الأرصاد العمانية @OmanMeteorology

آخر الصور الجوية توضح:
-تدفق سحب متوسطة/عالية على أجزاء من سواحل بحر عمان ومخافظات مسندم والبريمي والظاهرة
-نشاط سحب الخريف على سواحل وجبال محافظة ظفار
-تكثف السحب المنخفضة على أجزاء من سواحل محافظة الوسطى

Translate Tweet

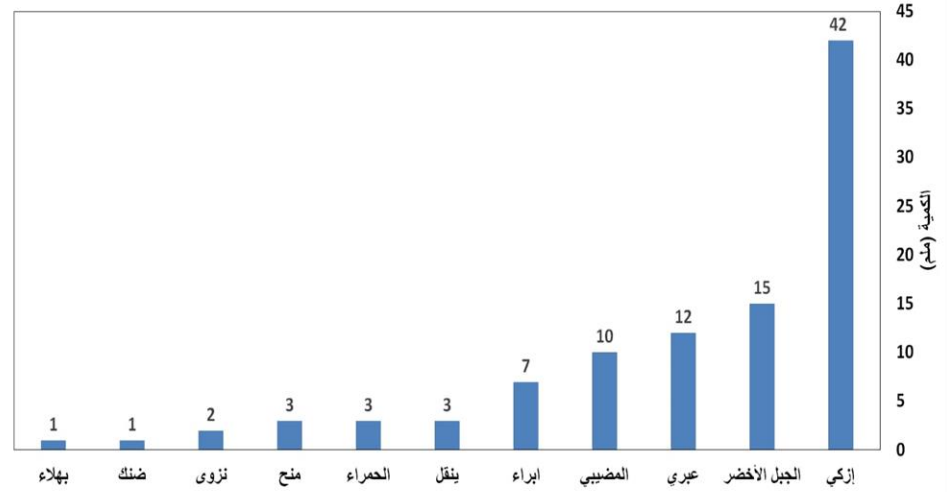


@OmanMeteorology

8:01 AM · Jun 26, 2022 · Twitter Web App



توزيع هطول الأمطار على عدد من ولايات سلطنة عُمان خلال الفترة من يوم 26 إلى 28 يونيو 2022م

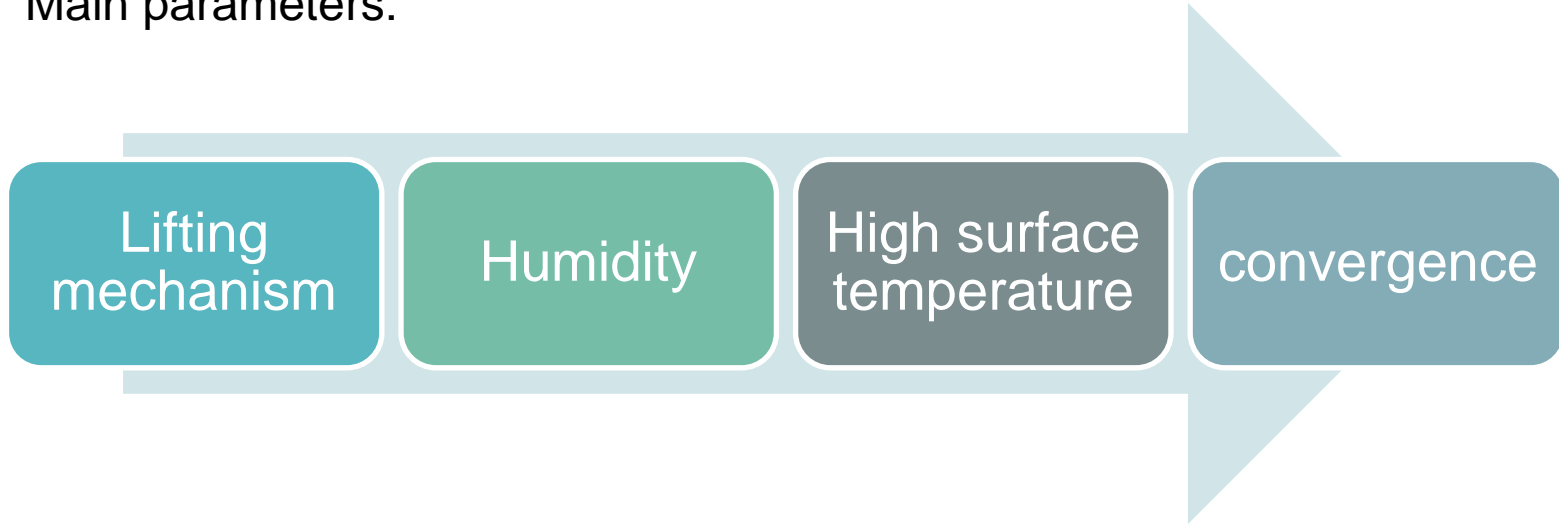


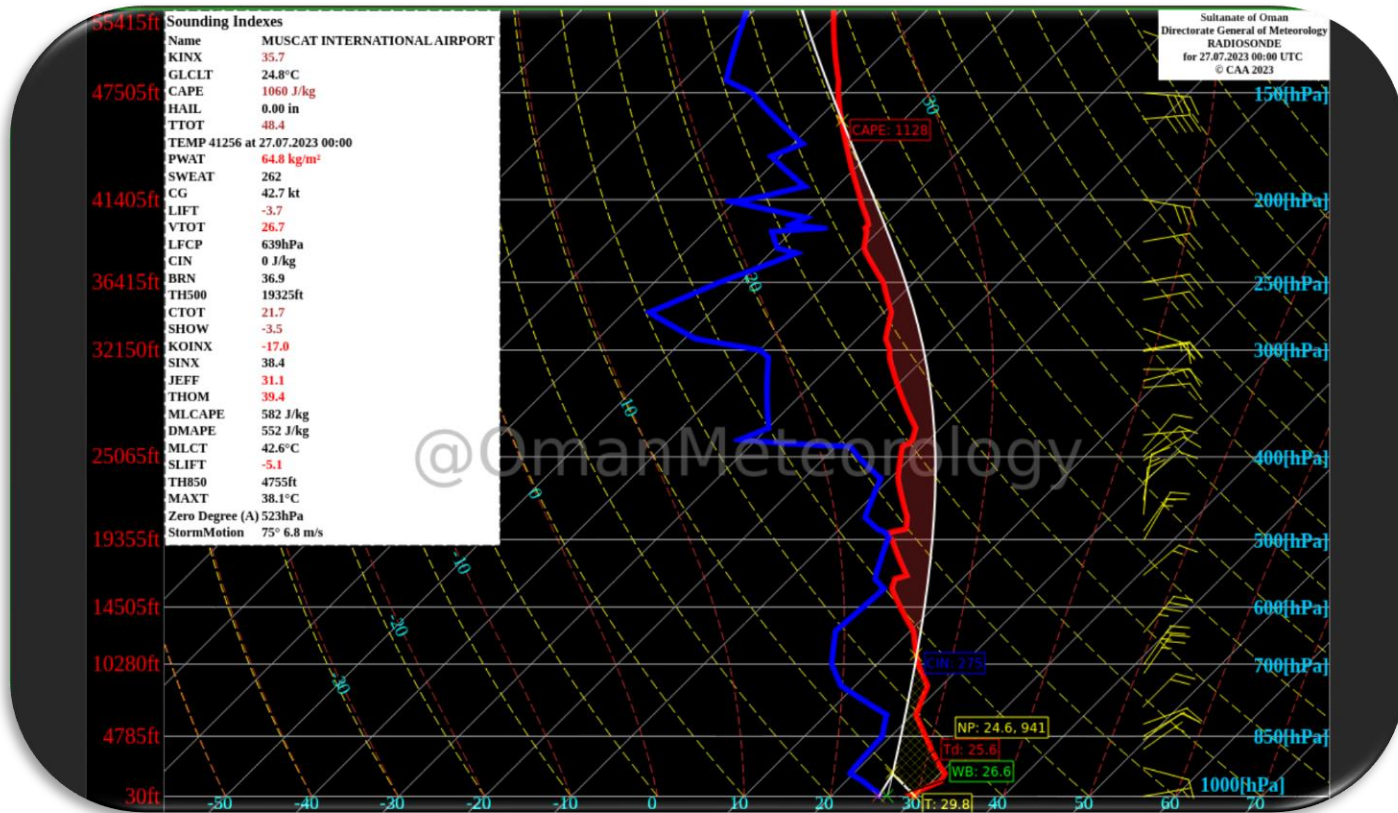
MAHWE.OM

سلطنة عُمان
وزارة الموارد المائية والرياح والبيئة والطقس

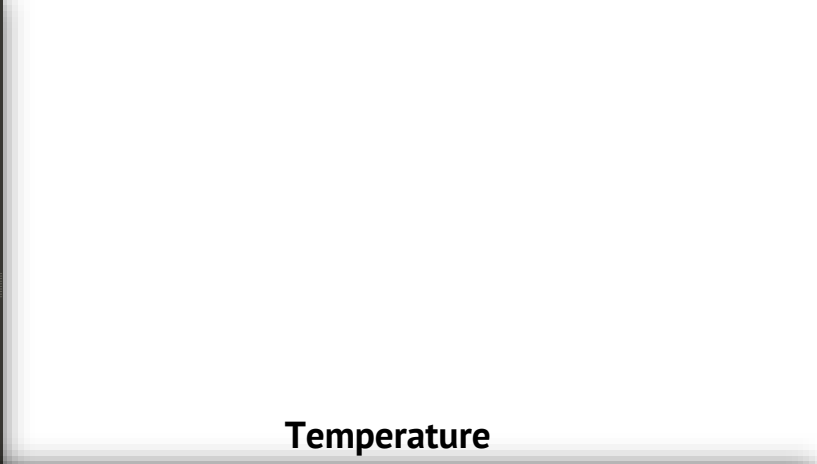
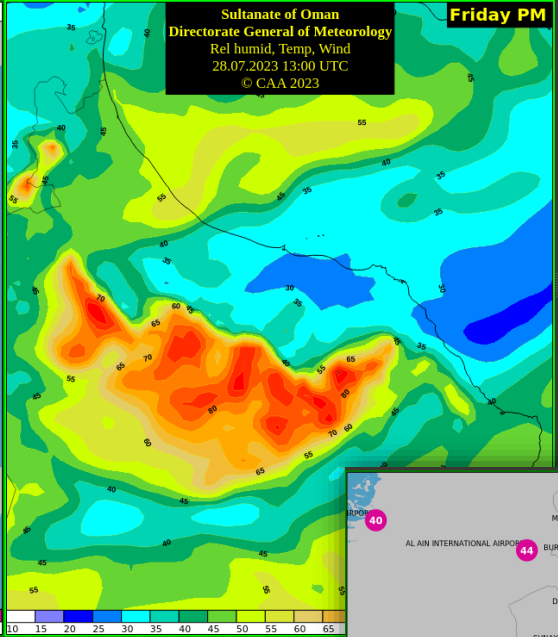
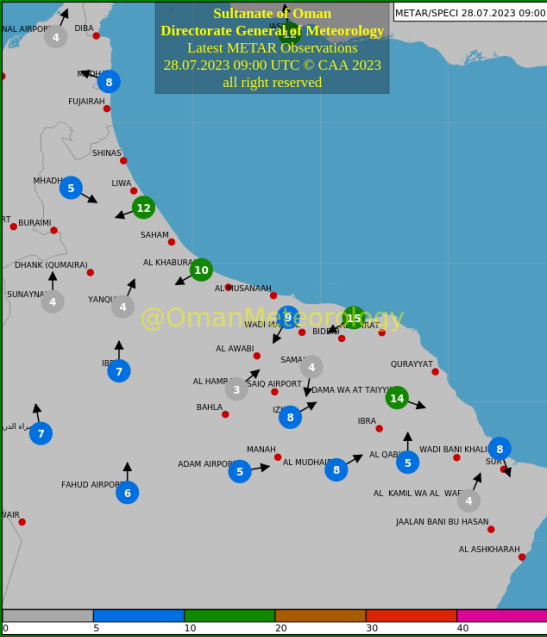
28th July 2023(Local event)

Main parameters:

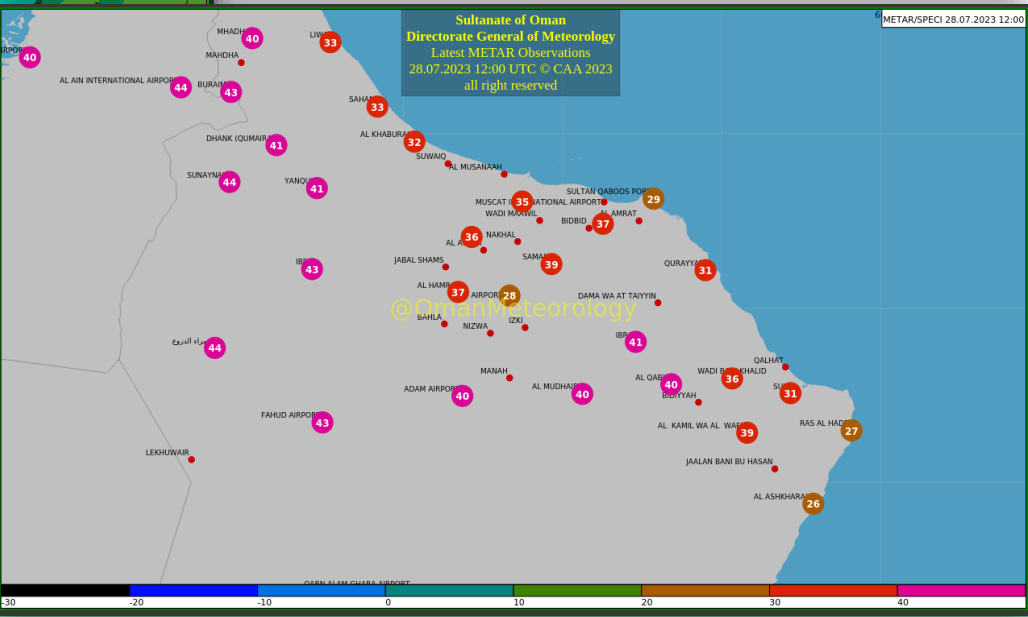




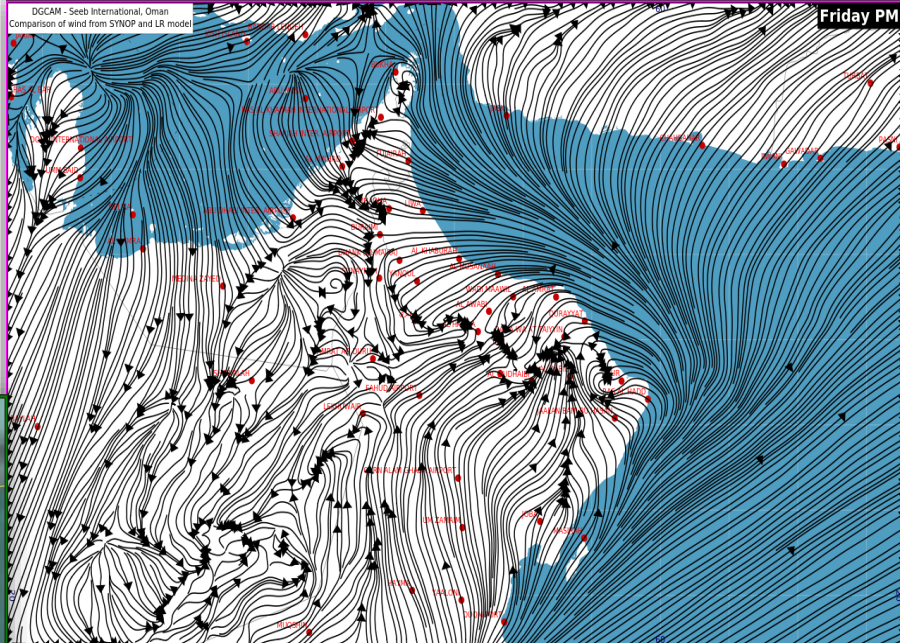
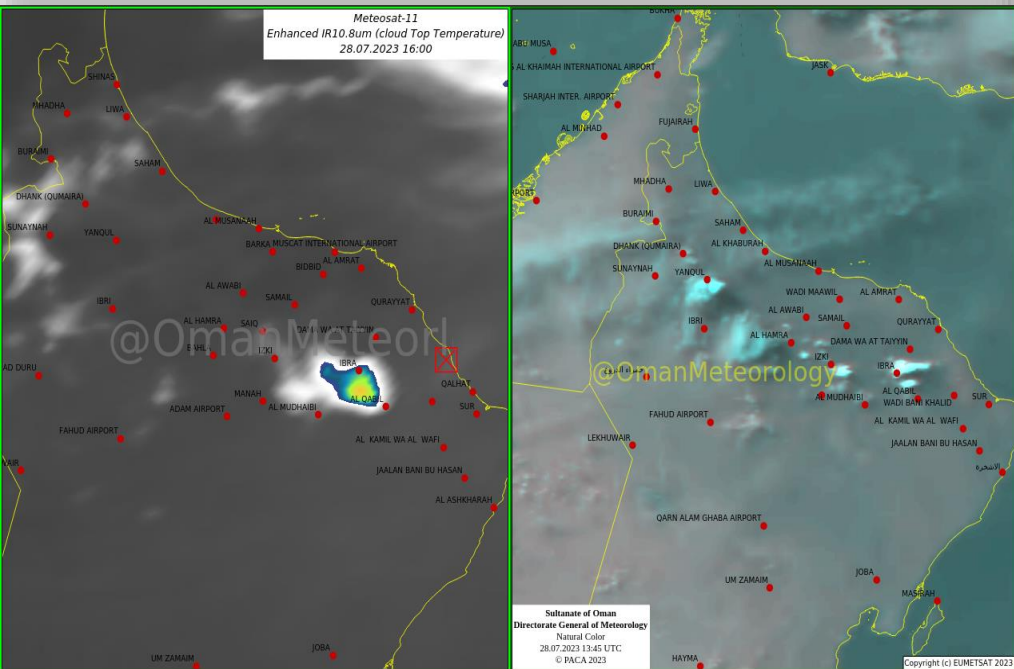
Radiosonde for Muscat 00 UTC



Temperature



Satellite Images



Stream line

Subject 5:

Monsoon

- Monsoon(Background)
- Summer monsoon
- Khareef

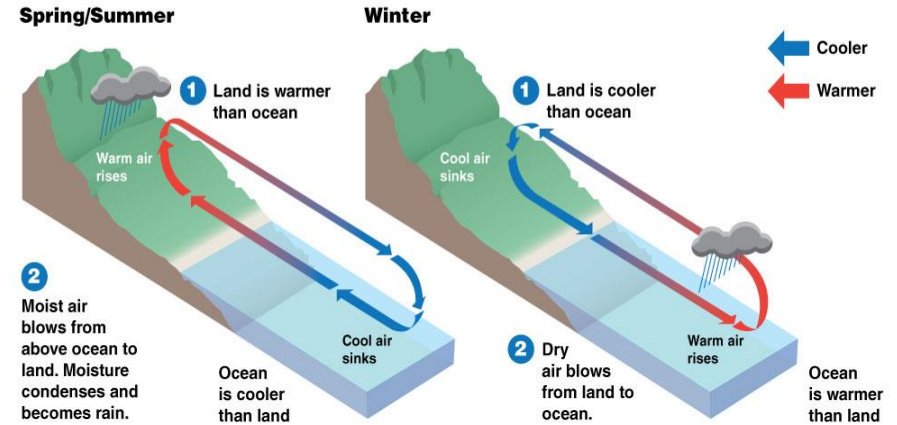
What is monsoon?

A monsoon is a shift in winds that often causes a very rainy season or a very dry season. Although monsoons are usually associated with parts of Asia, they can happen in many tropical and subtropical regions.

What causes a monsoon?

A monsoon is caused by a seasonal shift in the winds. The winds shift because the temperature of the land and the temperature of the water are different as seasons change. For example, at the beginning of summer, the land warms up faster than bodies of water. Monsoon winds always blow from cold to warm. In the summer, warm air rising off the land creates conditions that reverse the direction of the wind.

How a monsoon works



Why does a monsoon cause rain?

- ❖ The monsoons that cause heaviest rainfall are summer monsoons near the Indian Ocean. Warm water in the ocean evaporates, rising into the air. This causes the wind to change direction and moisture blows toward the land in countries such as India and Sri Lanka. The warm, moist air then condenses and becomes rain. The result is a period of humidity and heavy rainfall that can last for months.
- ❖ When the wind changes direction in the winter, it is called a winter monsoon. Winter monsoons in these regions near the Indian Ocean are usually dry.

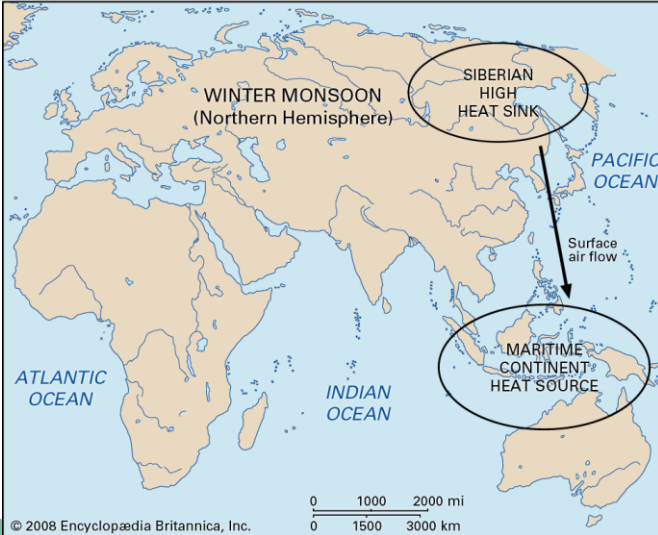
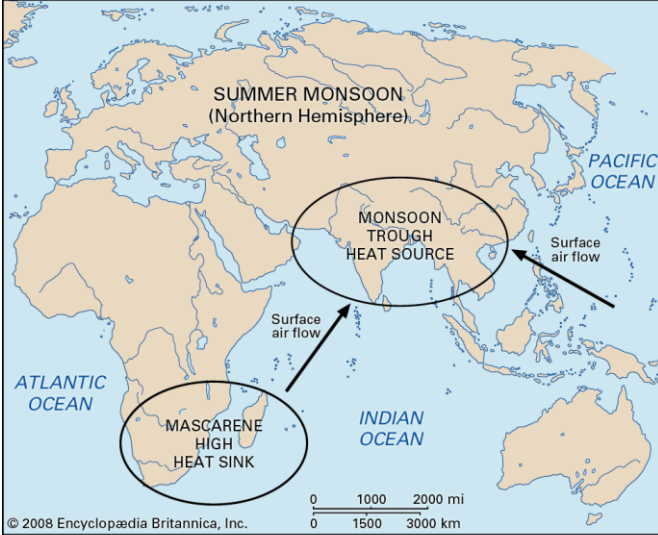
Summer monsoon components:

Monsoon Trough

Mascarene High anti-cyclonic system

The low level cross-equatorial jet

The Tibetan high pressure system/Tropical easterly jet



Monsoon Trough

- Formed over northern India.
- Northern Hemisphere Summer as part of the global ITCZ.
- Associated with **surface low pressure.**

Mascarene High anti-cyclonic system

- Situated over the south-east Indian Ocean(30° S, 50° E).
- Generates a **large outflow of air.**
- The air moves north over the equator where it becomes a south- westerly flow known as the **low level cross-equatorial jet.**

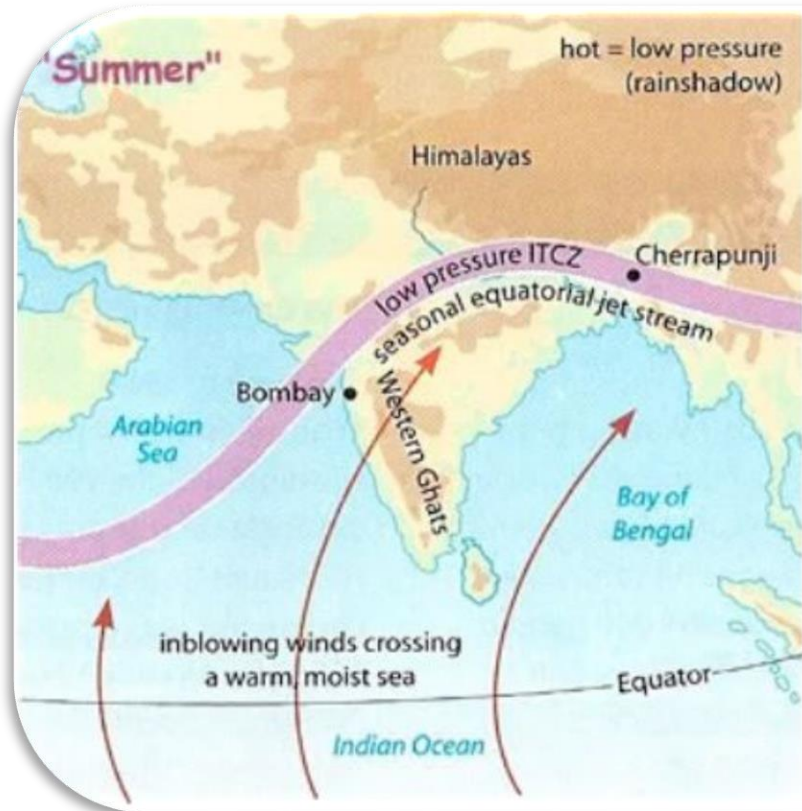
Low level cross-equatorial jet

- Maximum intensity from **June to August.**
- The jet splits in two branches at around **10° N, 60° E** at this time.
- Arrive over central west and southern coasts of India.
- Important **for rainfall amounts** over western India.

The Tibetan high pressure system/Tropical easterly jet

Upper level anticyclone.

- Located over northern India above the surface monsoon trough; (low level convergence matched by upper level divergence)
 - Well established during summer.
- Moves in a south-southeast direction following the zone of maximum surface heating and low pressure.
- The outflow of air from the southern flank of the Tibetan high gives rise to the **Tropical easterly jet.**
- **Tropical easterly jet** lasts from June to September.



Main factors for Khareef

Difference in pressure between OOTH station and OOSA station is around 4 mb.



Temperature and Dewpoint close to each other from surface till 800 hpa

Blowing northerly winds in 700 hpa layer.

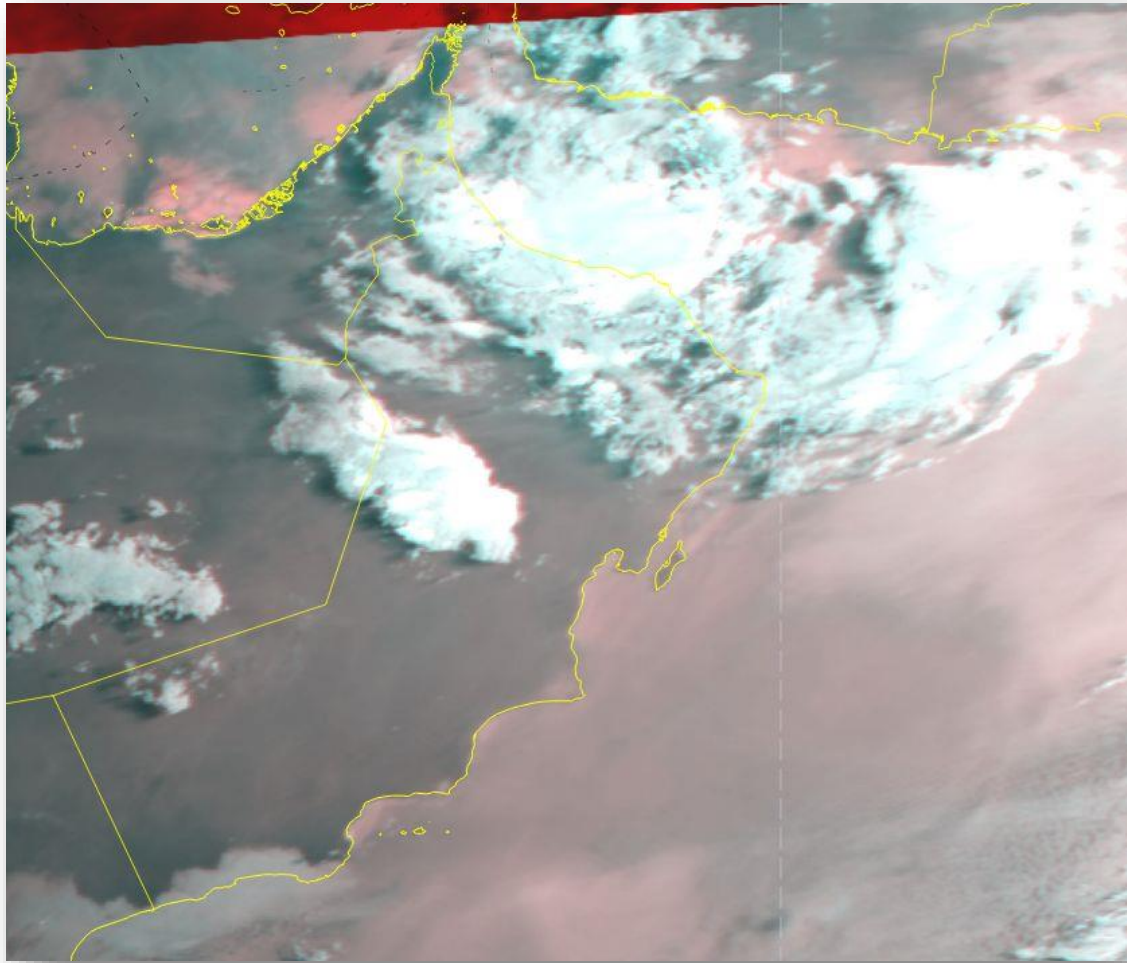


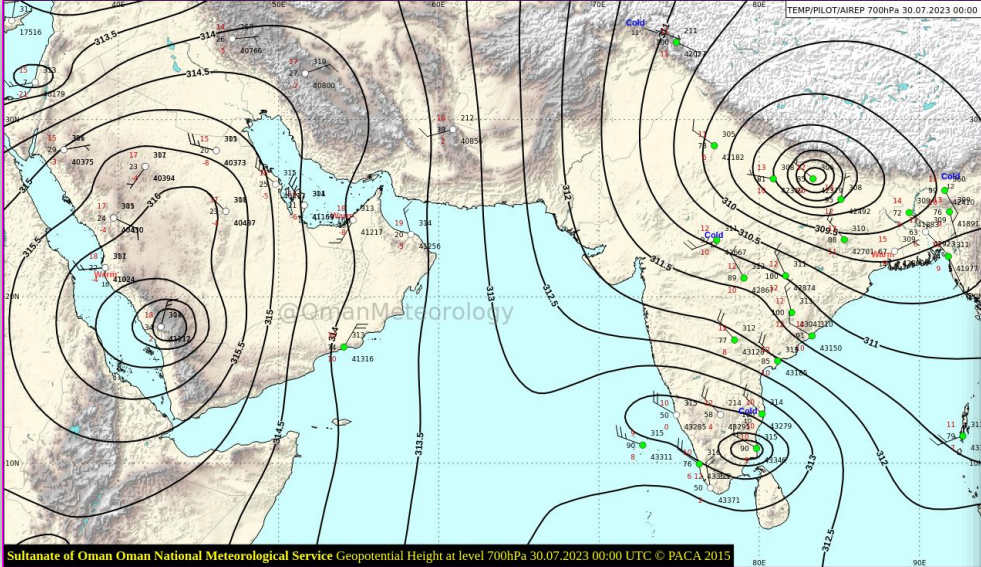
Active SW monsoon winds.



existing of thermal low over south east of Arabian peninsula.



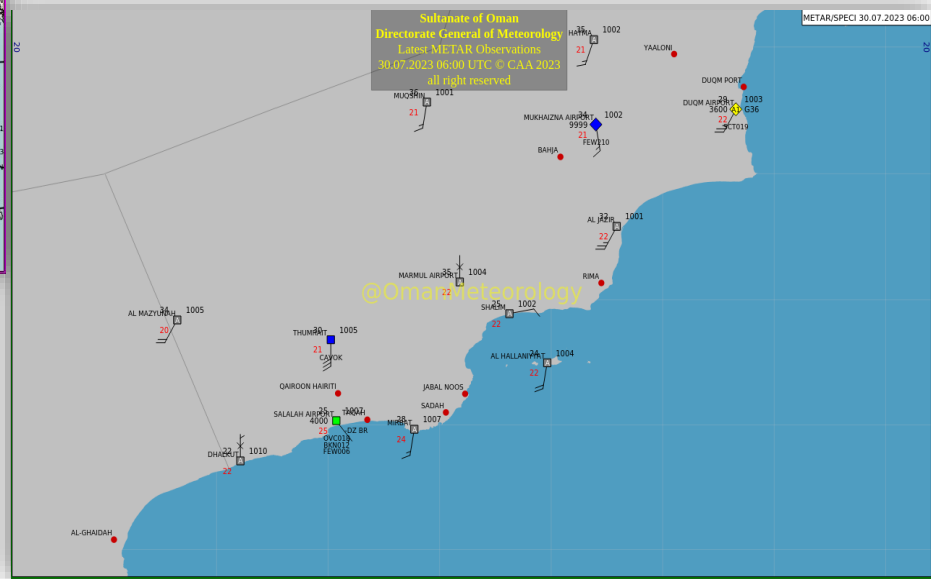


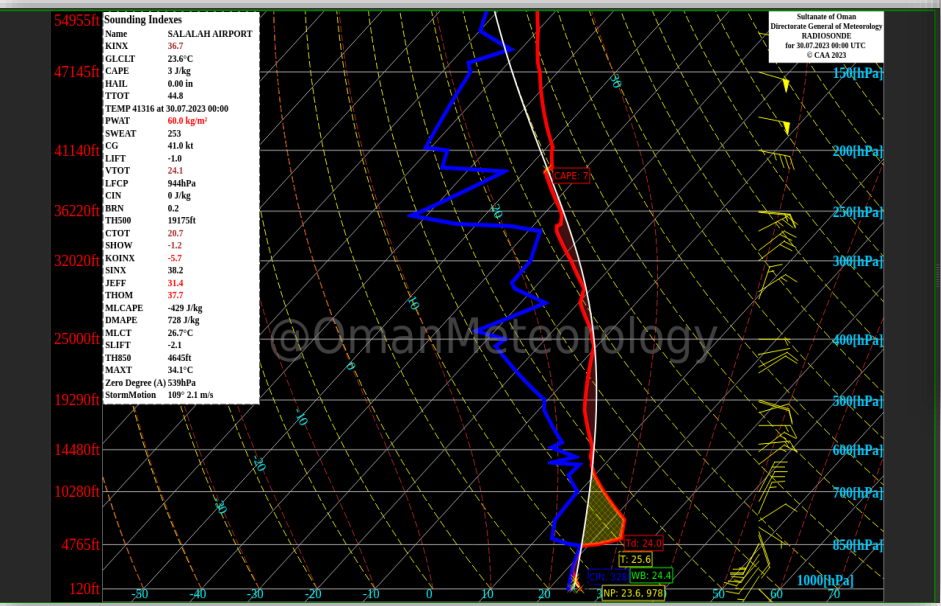


Sultanate of Oman Oman National Meteorological Service Geopotential Height at level 700hPa 30.07.2023 00:00 UTC © PACA 2015

700 hpa actual

SW winds at sfc





Radiosonde OOSA 00 UTC



OOTH & OOSA

Scan this

Kindly scan this “QR code” to evaluate this lecture.

Thank You!

