

**Episode 4**  
**Title - Variation in Earth Climate System**  
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**Synopsis :**

Earth's climate has so much to offer. There are many variations in the earth's climate system. Each one of them has a different story. It is no doubt technical, but is explained with examples and activities to understand them the best.

**Cast :**

Abha - 10 year old girl  
Nupur - Mother (35 years)  
Ramachandra - Grandfather (65 years)  
Sunil - Meteorologist (male - 45 years)  
Laxman - Driver (40 years)  
Raghav - Tea vendor (28 years)

(Honking on road, noise of vehicles, music playing on car stereo, driver humming on the music, a girl laughs slowly covering her mouth)

**Nupur** - You should not laugh like this.

**Abha** - Maa, what is he singing ? I can't hear properly or understand anything...

**Laxman** - What happened ? You are smiling at me...

**Nupur** - No...no...

**Abha** - What are you singing uncle ?

**Laxman** - I am just humming, not singing anything in particular...

(Abha laughs again)

**Nupur** - Papa ji, please take this shawl... it is getting colder...

**Abha** - Yes mom, even I am feeling cold...

**Ramachandra** - Wear something warm... You would need more warm clothes with cap and gloves when we reach the top...

**Abha** - I know Dadu... This sounds so strange, brother must be sitting in AC watching TV right now... and we are feeling cold and wearing warm clothes... I know Nainital is a hill station and it is cold here... but me and brother are in the same country, some 300 kilometres away... and so much difference in temperature... It's funny...

**Nupur** - You find everything funny Abha... Relax... and try to cover yourself under the blanket with Dadu...

**Abha** - Uncle, you should also wear something warm...

**Laxman** - Don't worry dear... I am used to this weather... It has been 10 years that I am driving taxi on this route... Now no hot or cold affects me... I would need warm clothes once we reach Nainital...

**Abha** - How is that possible ? I am feeling cold, Dadu and Maa are also feeling cold but you don't feel so... That's magic...

**Laxman** - No magic here... We get used to the place we live in... We enjoy the cold temperature... But feel very fussy in hot places... We can't bear hot climate, but enjoy in cold climate... Unlike you, who would enjoy warm weather more than cold...

**Ramachandra** - Laxman, let's relax for some time and have some tea and snacks... Stop the car near some tea stall or dhaba...

**Laxman** - I was about to stop at my favourite tea stall on the way... He is a good friend of mine and he makes brilliant tea... best place on the way to stop by and relax... It is 2 kms away from here...

**(Scene change - Car stops near a tea stall, sound of people chatting, the tea vendor talking loudly)**

**Laxman** - Hi Raghav, I am here again...

**Raghav** - Hi Laxman, how are you ? After a long time, how was your sister's wedding ?

**Laxman** - Everything went well... She is happy and we are happy too...

**Raghav** - What else one can ask for ?

**Ramachandra** - Ask him to make some good tea, I am having a headache, may be coz of temperature variation...

**Laxman** - Uncle, please sit here, I would get tea for you... Mam, you would also take tea ?

**Nupur** - Yes... and a glass of hot milk for Abha...

**Abha** - Maa, can I have tea as well...

**Nupur** - You can... but I think you should have some milk rather than tea...

**Ramachandra** - Your mother is right... You are not used to having tea and we have to move ahead... There is another 2 hour drive before we reach to Sunil in Nainital...

**Abha** - Ok Dadu... I will have milk Maa... Why we are going to Sunil uncle ?

**Nupur** - Because Sunil uncle is your father's best friend... he insisted that we stay back at his place... And one more thing... you find this temperature difference funny... Right... Sunil uncle would help you understand the fun better...

**Abha** - How come ?

**Nupur** - Because he is a meteorologist...

**Abha** - but...

**Nupur** - No more questions... wait till we reach Nainital, to Sunil uncle's place...

**Raghav (interrupting the conversation)** - Namaskar saheb ji... Here is your tea... the best one on the way... tries it...

**Ramachandra** - You are doing very good job... How long you are here serving tea to people...?

**Raghav** - I have been doing this since my childhood when I was 8... At that time with my father, he taught me the art of making best tea around...

**Abha** - Maa, see even this uncle is not wearing warm clothes like us...

**Raghav** - Don't worry, we would wear warm clothes in some time from now... When it gets dark here, that is in the evening the temperature drops... then we need our warm clothes... Till this time a shawl keeps us warm...

**Ramachandra (sipping tea)** - Very nice... It feels like you already knew what I was looking for... Nupur, try this tea... it's amazing...

**Laxman** - People going to Nainital, definitely stop here to have Raghu's tea... Raghu is what we friends call him...

**Raghav** - It is all your love and blessings Saheb... that god has gifted me with this mastership...

**Laxman** - Don't try to be modest...

**Nupur** - No, no he is right... this is god's gift...

**Abha** - My milk is also yummy...

(Everyone laughs)

**Raghav** - Last week there was a couple traveling up, stopped by here as the wife was not feeling good... She could not withstand the difference in climate... She was shivering, it was actually very cold that day and they had to return from here...

**Abha** - This sounds funny... how a place is hot and at the same time of the year the other place is cold... I left home in my summer dress and now see, I am wearing a sweater, socks, shoes, cap...

**Raghav** - This is the magic of god, who has made nature... which changes from place to place and time to time...

**Nupur** - All this depends on the climatic zones of the earth...

**Raghav** - Science plays its part, but we depend mainly on god's wish... that has made this **earth and the variations we see...**

**Abha** - There was a play in our school, I was a part of it... I played the part of earth... My lines were -

(Abha talking as if performing in the play)

**Abha** - Do you know who I am ? I am the earth. Yes, this very planet and I would like to talk to you about a couple of things which worry me and should upset you too. Everyone talks about the weather, like what it is going to be today and next day. Whether it would be cold today, more than yesterday... will it rain ? And its normal as the weather plays a very important role in our lives. It influences us if we are going to school or if we would be able to play outside. And it also influences all the living things on our planet... as well as the plants...

(Everyone claps)

**Abha** - Don't disturb... there is more...

(Abha continues talking as if performing in the play)

**Abha** - At times I am hot, very very hot... this is because of climate change... which is something that human beings have a big responsibility for... Every time you turn on the light or computer or the microwave or even a shower... you are consuming energy... This energy is produced largely by burning gas, coal or petroleum which is known as fossil fuels... (Abha errs... tries to remember but she forgot her lines)

**Nupur** - You forgot your lines ???

**Abha** - Yes Maa...

**Ramachandra** -It's ok... You were very good... and your play was also very good... Your father recorded the whole of it and showed us... You preformed really well...

**Abha** - Thank you Dadu...

**Raghav** - Very nice Abha... I really liked your lines... Did you understand anything as well ?

**Abha** - It was all so funny uncle...

**Nupur** - She finds everything funny... now let's move from here... we have to reach up before sunset...

**Ramachandra** - We can see the sunset on the way also... It is very beautiful and scenic...

**Abha** - I would love to see... That is what we have come here for...

**Laxman** - Let's go uncle... Bye Raghav... See you soon...

(Sound of car starting, music resuming in the car, driver humming the song)

Abha laughs again

**Nupur** - Sshhhhhhhh !!!

**(Scene change - Everyone reaches to their destination)**

(Doorbell rings)

**Sunil** - Welcome... I was waiting for you all...

**Ramachandra** - Hello son... We stayed back at the sunset point to see the sunset...

**Sunil** - Ok... How are you Abha ? How are you Bhabhi ji ?

**Abha** - Maa is always good and the best... I am also fine uncle... (Laughs)

**Nupur** - Sshhhhhhhh !!!

**Sunil** - its ok let her enjoy...

**Abha** - Uncle, Maa was telling me that you are a meteorologist... What do you do ?

**Sunil** - I use scientific principles to explain, understand, observe or forecast the earth's atmospheric phenomena... How the atmosphere affects the earth and life on the planet...

**Ramachandra** - Let's relax and then you can bang your questions on Sunil... Let's get fresh first...

**Sunil** - Sure uncle, this way please...

(Door opens and shuts)

**Nupur** - You have a beautiful house Sunil...

**Sunil** - Thanks, by the way when is Rakesh coming ?

**Nupur** - May be by tomorrow evening or he might not come as well... depends on his work schedule... Abha insisted, so we thought of bringing her here... it is vacation time and kids want to go out...

**Abha** - Yes... I am done... now uncle I am hungry...

**Sunil** - Here is dinner ready for you...

**Abha** - Dinner at 7 pm, it is too early... I want chocolate milkshake and cookies... This is what I eat at this time...

**Nupur** - Conditions here are different, just have it what uncle is saying...

**Sunil** - It's ok... come here Abha... Actually we live at a height and here you won't believe sun sets very early around 5 pm and sun rises very early as well... So we sleep early and get up early...

**Abha** - Ohhhh... So you want me to sleep by 8 pm ?

**Sunil** - No, you can get up as long as you want but let's have dinner first...

**Nupur** - Please come, I would serve all of you... Abha, go and call Dadu...

**Abha** - Ok Maa...

**Nupur** - She keeps eating our head with her questions... She would bombard many on you as well... She has a long list in her mind... Since I have told him that you are a meteorologist, she wants to ask everything....

**Sunil** - No that is a good sign... All her questions would be answered...

**(Scene change - Some news on TV about landslide, audio not very clear)**

**Ramachandra** - Thank god, we reached safely and hope Rakesh can come here tomorrow safely... These landslides happen anytime... I am done with dinner and I am feeling tired... I am going to sleep... Are you coming Abha ?

**Abha** - No... I want to talk to uncle...

**Nupur** - I want to watch my serial in TV...

**Sunil** - You come with me, we would sit on the couch near the fire in the blanket...

**Abha** - So uncle, mummy told me on the way that temperature at various places on this earth is different... I understand that it is because of the presence of sun that one area is hot and the other one is cold... Some places have longer days and shorter nights and vice versa for other places... But still I want to understand this concept in detail...

**Sunil** - So you know that Weather changes from day to day and even from hour to hour... It can be hot and sunny during the day and cold and wet in the evening...

**Abha** - Yes Sir, I can even feel that here... Normally I play till 8 in the night during this time of summer... but here we had dinner at 8... This is a big difference in lifestyle...

**Sunil** - There are two main reasons that climate varies from place to place... First, the amount of energy arriving from the sun, and Second the circulation of the atmosphere and oceans which carry heat and moisture from one place to another...

**Abha** - I could not understand anything...

**Sunil** - Ok, Now tell me, you must have read about Equator...

**Nupur (speaking from a distance)** - Yes I taught her last week for the test, that equator is an imaginary line on the globe which divides the earth in two equal parts... Here, the Temperature is very high... All the major deserts are present in this zone... and lot of rain also happens in this area... Do you remember Abha...

**Abha** - Yes Ma...

**Sunil** - Abha, do you know why this dry desert area gets heavy rainfall ?

**Abha** - It is very simple sir... Because of high temperature near the equator causes faster evaporation of water...

**Sunil** - Very good... You are intelligent...

**Abha** - Thank you sir...

**Sunil** - Why are you calling me sir... I am not your teacher, I am your friend... you can call me uncle...

**Abha** - Ok Uncle...

**Sunil** - Anyways, going back to the topic... Climate zones of earth are distinguished by the latitudes that run across the earth surface... The most important ones are equator, as we discussed, then the tropic of cancer towards North Pole, tropic of Capricorn towards South Pole, the Arctic Circle and the Antarctic Circle...

**Abha** - Difficult names uncle...

**Sunil** - But the funda is very easy... The region between the two tropics that is the tropic of cancer and the tropic of Capricorn is the Torrid Zone... or the tropic zone... This is the hottest part of the earth... The sun rays fall directly on this zone... Thank god, Equator does not pass through India... India is north to the equator... that is in the northern hemisphere... This zone includes most of Africa, Southern Asia, Indonesia, Northern Australia, and Central America...

**Nupur (from distance)** - You remember world map that you were learning... can you make out these places... Or you just note down the names for the time being and can check it on the world map later, once we return home...

**Abha** - Mom, you are listening to all our talks, come here sit with us... and yes, I can relate much of this, still it is better to note down these things... Can you please repeat it for me uncle... I would note down...

**Sunil** - Sure... I was saying that the Torrid Zone includes most of Africa, Southern India, Southern Asia, Indonesia, Northern Australia, and Central America...

**Abha** - Yes... all the places noted uncle...

**Sunil** - But it's not over... Next is the Temperate zone which falls between the tropic of cancer to the arctic circle in the northern hemisphere and tropic of Capricorn and

Antarctic circle in the southern hemisphere... This is the perfect vacation zone... as it has mild temperatures and enjoys all the four seasons annually... summer, spring, autumn and winter... It is because in these regions sun is never directly overhead... So these areas get moderate temperature...

**Nupur** - Moderate means neither too hot nor too cold... In few such areas there is year round rainfall... In India, Tropic of cancer passes through Rajasthan, Gujarat, Madhya Pradesh, Chhattisgarh, West Bengal, Tripura, Mizoram, Jharkhand... On earth this line passes through Chile, Argentina, Paraguay, Brazil, Namibia, South Africa, Mozambique, Madagascar, Australia, Fiji...

**Abha** - Raining always... I don't like rain... I don't want to go to these regions...

**Sunil** - Then you would not like to go to the polar zones as well...

**Abha** - Why so ?

**Nupur** - Because it is very cold here throughout the year...

**Sunil** - In the northern hemisphere, there is North Pole and in the southern region there is South Pole... These regions get very less sun rays throughout the year, so they are very very cold...

**Nupur** - It is full of ice and cold water...

**Abha** - So, everything depends on the Sun... As uncle said - Direct sun rays on the Torrid Zone makes it hot... And slanting sun rays on the temperate zone makes the climate there moderate and less sun rays makes the Polar Regions cold... How do the sun rays affect the climate?

**Sunil** - Very good question Abha... Sun rays play a very important role in the climate of any place... You know that earth is spherical in shape... So, the region near the equator gets more direct rays of sun, which get concentrated over a small area... and so they heat up the region more...

**Abha** - And as we go away from the equator the sun's rays strike the earth surface at an angle...

**Sunil** - That means the sun's slanting rays spread over a large area and hence they don't heat to the same extent as direct rays... and that is why the temperature decreases as we go away from the equator... There is one more concept in this... when something falls directly, it covers a smaller area whereas if something falls slanting, it covers more area... so the concentration level changes... same amount of heat is spread over more area and so less hot...

**Abha** - That means, the higher you go, the lower is the temperature...

**Sunil** - Direction of sun rays and the elevation are two important factors that affect the climate of a place...

**Abha** - Are there any other factors that affect climate of the earth...



**Sunil** - There are many other factors... like ocean currents, terrain, topography, altitude, latitude, prevailing winds, proximity to water... etc. etc.

**Nupur** - Don't you think all this would be too heavy for her... She is too young to understand all this...

**Sunil** - Don't worry... I would tell her all this in the morning with the sunrise and practical exposure...

(Both of them laughs)

**Abha** - You both are making fun of me... right...

**Nupur** - No, uncle is feeling sleepy and so am I... Let's go to bed now... rest of the talks in the morning...

**Sunil** - Abha, make sure you get up around 5 in the morning to see the sunrise... I would take you out to a beautiful place...

**Abha** - Ok, wow ! Morning treat... sunrise and fun together...

(Scene change - Complete silence, suddenly an alarm rings, Abha gets up)

**Abha** - Maa, get up fast... Sunil uncle must be waiting for us... I don't want to miss the sunrise...

**Nupur** - Ok, Get ready, I would ask Dadu to get ready too...

(Nupur knocks the door and calls out loud)

**Nupur** - Papa ji, please wake up, we need to go out to see the sunrise...

(The door opens)

**Ramachandra** - See, I am ready... I slept early, so I got up early today... Let's move...

**Abha** - I am ready too... But where is Sunil uncle...

**Nupur** - He must be in his room, Abha you call him, I would make some tea for all of us...

**Abha** - Ok Maa...

**Sunil** - Hey all set, let's move now... Laxman must be waiting in the car, I already told him about our morning plan...

**Nupur** - Tea and snacks are ready... Let's move... It is already 5.30 now...

**Abha** - Good morning Laxman uncle... We are going out to see the sunrise...

**Laxman** - Sunrise here is really beautiful... you are going to enjoy it thoroughly...

(Car starts moves and reaches the destination, everyone gets down)

**Sunil** - We are at the Naina peak... It is the highest hilltop and one of the famous tourist spots in Nainital... Abha, come here jump to this point... now see we are at such a height... You can see the Nainital town from here... and there we can see the first rays of the sun... Have you even seen this before...

**Abha** - Ohh My god ! I never thought to see this beauty here...

(Short Music piece to establish sunrise) (Music fades)

**Abha** - I can't see the sun... It only got brighter... dawn is over... but where is the sun...

**Nupur** - It is too cold because we can't see the sun from here... If sun rises properly, it won't be that cold... Remember Sunil uncle told you about the same... If the sun rises and sun rays fall directly here, it won't be that cold... The temperature would rise automatically...

**Ramachandra** - It is really worth getting up so early and coming here... Sunil, my son... I could hear you talking to Abha last night about the climate change concept and factors... So, the brainstorming session is over or still something is left...

**Nupur** - Papa ji, Sunil has brought us here for the brainstorming session only, which continues like this... Sunil... you are trying to tell her about the altitude concept... right...

**Sunil** - Yes and also some others... Abha, now understand... we are standing at a height... This is called Altitude... Altitude is the measurement of height using sea level as the base... On an average, temperatures drop about 1 degree C for every 160 m of altitude... The higher the altitude, the lower the temperature...

**Abha** - That is why it is more cold here as compared to your home uncle... and as high we move, it would get colder and colder... Am I right...

**Nupur** - Absolutely... You are a genius Abha...

**Sunil** - No doubt in that... But here we are discussing the concept at a very local level... Think of the same in terms of earth as a whole... The concept remains the same, only the area increases...

**Abha** - It is freezing cold... Uncle, can we move on now...

**Laxman** - We can sit there near that cafe and have our tea and snacks while talking...

**Sunil** - Good idea Laxman...

(All of them move to the cafe, sit and eat, drink)

**Sunil** - There is one more thing I want to tell you... Next important factor of climate change is nearness to water bodies... Land gains and loses heat much faster than water... Based on other factors certain areas closer to large bodies of water may have a relatively small yearly temperature range...

- Abha** - Ok... Things are not that complicated... Uncle you explain things very nicely... I get a clear picture of every factor...
- Sunil** - Climates often differ on either side of a mountain... On one side as air rises over a mountain, it cools, condenses, and releases moisture in the form of rain... On the other hand if dry air flows over the mountain, it descends and warms, usually producing deserts...
- Nupur** - This is the effect of mountains... As you are explaining things even I have a question to ask...
- Abha** - Maa you too... (laughs)
- Nupur** - Yes... me too... What happens in case of oceans...?
- Sunil** - The ocean covers more than 70 percent of the surface of our planet... It is hard to imagine, but about 97 percent of the Earth's water can be found in our oceans... Of the tiny percentage that's not in the ocean, about two percent is frozen up in glaciers and ice caps...
- Abha** - Then what is the water that we drink and use in day to day activities... Only the 1 percent left...?
- Sunil** - Yes... In terms of climate change... The Oceans currents can warm or cool the air above... They greatly affect temperature, especially in coastal areas... These currents keep many coastal areas on earth much warmer than they should be in winter...
- Nupur** - When we are talking about water bodies, so now it is time for a boating ride in Naini lake...
- Abha** - Yes... our next destination...
- Laxman** - And there are many more... Rakesh sir has given me the responsibility to make you travel every hook and corner of Nainital... I would take you to all the places here... I have made the route accordingly... First let's go to the ropeway... Then the boating ride... then shopping at mall road...
- Ramachandra** - Think about me too... I need some rest in between...
- Laxman** - I have arranged for the same, let's move from here...
- Sunil** - Hey... Try this, the most famous sweets of the region... This is called hawa mithai...

(Everyone talking... but sound fades out)