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| **Project ID: 2021-1-CZ01-KA220-SCH-000034484**    **COURSE FOR ENVIRONMENTAL EDUCATION**  *e-Modules: Teaching Learning activities and their technology enhanced material set*  ***DISCLAIMER***  *Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.*  **COURSE AUTHORS**   |  |  | | --- | --- | | AFAD Logo T.C. Afet ve Acil Durum Yönetimi Başkanlığı png image ... | ***Güray Karakaya*** | |

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| **MODULE 3** | **NATURE and CLIMATE CHANGE** |
| **PART 6** | **Climate Variability vs. Climate Change** |
| **Lesson 1-2** | **The differences between climate variability vs climate change** |

**SUMMARY**

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# 1. COURSE TIME, TARGET AND TOPIC

* **Age of target students: 15+**
* **Teaching time: 2 hour**
* **Disciplines: Geography, Human Sciences, Maths, Science, Technology**
* **Title: The effects of unplanned settlement, industrialization, transportation and other actions**

# 2. COURSE OBJECTIVES

## Competences promoted in this lesson:

* **1.Communication in foreign languages competency    - CLIL -**
* **2.Mathematical competency and basic competencies in science/technology – STEAM -**
* **3.Social and citizenship-related competencies**

## Objectives:

**Developing students’ Systems–thinking competence; anticipatory ( future thinking)competence;  interpersonal competence - collaboration competence- ; critical thinking competence; integrated problem solving competence**

## Lesson objectives:

* **Students discuss Climate change vs Climate variability**
* **Students investigate the examples of climate variability**

# 3. LEARNING – TEACHING PROCESSES

There are 4 activities in this lesson:

1. **ENGAGE:** **Time-traveler**
2. **EXPLORE: Questions for Discussion**
3. **EXPLAIN: The Characteristics of La Niña and El Niño**
4. **EXTEND: Ancient civilisations**

# 4. EVALUATION

Students are asked some questions to check their comprehension of climate change and climate variability

1. What is weather ?
2. What is climate? (average over how long?) What fields are used to describe climate (temp & precip)?
3. What affects climate in a particular location ( Proximity to oceans, latitude, elevation, mountains, land surface, etc...) ? What determines global average climate? What things are external to the climate system? What are internal factors affecting climate? How do they affect climate?
4. What time frame do we use to distinguish short-term climate variability and long-term climate change ?
5. Do you think ancient peoples were responding to short-term climate variability or long-term climate change?

# 5. DOCUMENTS

### ENGAGE

**Ice Breaker :** Students are invited to play **‘Hope and Fears’.**

**INSTRUCTIONS:** Write down your greatest hope (about the climate change) and then your greatest fear. Read all the hopes first and then the fears and discuss

**Optional Tip:** In a face-to-face class, the participants differentiate the answers by writing each answer on a sticky note of a different color. Online, Padlet or Lino, which allow participants to create virtual sticky notes of various colors can be used.

**1-Engage:**

Encourage the group to answer the following questions: **"If you were able to travel through time, either forward or backward... :**

* Where would you go? If backward, to which time period would you choose? Why? If forward, to which year would you travel? Why?
* Would you describe the weather and the climate then?



**INSTRUCTION :**You can be a time-traveler. Make a google search and decide when and where to go. Describe the weather and the climate then

### EXPLORE

Students are given some dates and some places in 1999. They are asked to find out the important events on those dates there.

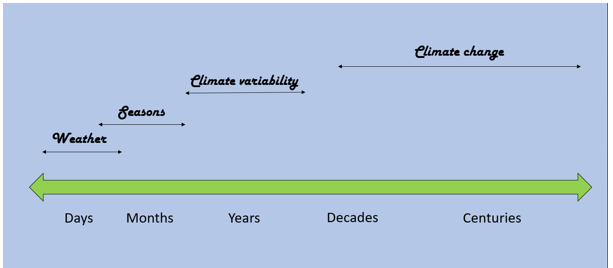
**Questions for Discussion:**

**Year 1999-**

**9-16 April (Cauca, Columbia) ; 5-15 May (Peru) ; 30 August-11 September ( Cordoba) ; 12-29 September (Honduras) ; 12-19 December (Venezuela)**

**INSTRUCTION :** There are some dates and places.Make an online survey and find out what happened then in those places ? What do you think they have in common ?

2. What caused those disasters? Look at the time scale and comment on the cause



### EXPLAIN

**Students are asked to match the given characteristics with either La Niña or El Niño, the causes of climate variability. They are asked to visit the website of the National Ocean Service and skim and scan the website and study the multimedia (audio material) and the pdf text about El Niña and El Niño to check their answers.**

**Little Girl in Spanish ­­­­­­­­­ \_\_\_\_\_\_\_\_\_\_\_\_**

**Little Boy in Spanish \_\_\_\_\_\_\_\_\_\_\_\_**

**Cooling of the water in the Pacific Ocean \_\_\_\_\_\_\_\_\_\_\_\_**

**Less precipitation and decreased humidity \_\_\_\_\_\_\_\_\_\_\_\_**

**Warming of the water in the Pacific Ocean \_\_\_\_\_\_\_\_\_\_\_\_**

**Rain and Flooding along the Pacific Coast \_\_\_\_\_\_\_\_\_\_\_\_**

**Unusually cold weather in Alaska \_\_\_\_\_\_\_\_\_\_\_\_**

**Increased humidity \_\_\_\_\_\_\_\_\_\_\_\_**

**Unusually warm weather in the rest of America \_\_\_\_\_\_\_\_\_\_\_\_**

**Drought in the southwest regions \_\_\_\_\_\_\_\_\_\_\_\_**

**Warm weather disrupting birds and fish’s lives \_\_\_\_\_\_\_\_\_\_\_\_**

**Increased thunderstorms ın the southern United States \_\_\_\_\_\_\_\_\_\_\_\_**

**Increased hurricanes in the Atlantic \_\_\_\_\_\_\_\_\_\_\_\_**

**More frequently occuring event \_\_\_\_\_\_\_\_\_\_\_\_**

**The Link Of the Online Document:** [**VariabilityAndChange.pdf (weather.gov)**](https://www.weather.gov/media/climateservices/VariabilityAndChange.pdf)

**The link of the website of the National Ocean Service :** [**What are El Nino and La Nina? (noaa.gov)**](https://oceanservice.noaa.gov/facts/ninonina.html)

**ANSWERS**

**La Nina Characteristic**

**Cooling of the water in the pacific ocean**

**Less precipitation**

**Decreased humidity**

**Unusually cold weather in alaska**

**Unusually warm weather in the rest of America**

**Drought in the South West**

**Higher than normal numbers of hurricanes in the Atlantic**

**Little Girl in Spanish**

**El Nino Characteristics**

**Little Boy in Spanish**

**Warming of water in the Pacific ocean**

**Rain and Flooding in pacific coast**

**Increased humidity**

**Warm weather disrupts birds and fish lives**

**Increase of thunderstorms ın the southern United States**

**Occurs more often**

**INSTRUCTION : Match the given characteristics with either La Niña or El Niño, the causes of climate variability. Visit the website of the National Ocean Service and skim and scan the website and study the multimedia (audio material) and the pdf text about El Niña and El Niño. Take notes and check your answers.**

### EXTEND

**Students are asked to make researches about the ancient civilisations deeply impacted by the climate variability and /or climate change.**

**Optional Tip : Students are asked to make a research about the collapses of some ancient civilisations - the people of the Andes, the Mayans, and the Vikings in Greenland- and describe the impact of the climate variability / change on the collapse of those civilisations. They are also asked to give example of an impact of climate variability and one example of an impact of climate change in the modern world.**

**INSTRUCTION : 1. Make a research about the collapses of some ancient civilisations - the people of the Andes, the Mayans, and the Vikings in Greenland - and describe the impact of the climate variability / change on the collapse of those civilisations.**

**2. Give example of an impact of climate variability and one example of an impact of climate change in the modern world.**

### EVALUATE

Students are asked some questions to check their comprehension of climate change and climate variability

1. What is weather ?
2. What is climate? (average over how long?) What fields are used to describe climate (temp & precip)?
3. What affects climate in a particular location ( Proximity to oceans, latitude, elevation, mountains, land surface, etc...) ? What determines global average climate? What things are external to the climate system? What are internal factors affecting climate? How do they affect climate?
4. What time frame do we use to distinguish short-term climate variability and long-term climate change ?
5. Do you think ancient peoples were responding to short-term climate variability or long-term climate change?

**INSTRUCTION :** Answer the questions and make further study if required.

**ENDING THE LESSON :**

Students are asked to explain more about the place and the year they traveled through the time machine ( in the Engage stage of the lesson ).

**INSTRUCTION :**Where and when did you travel by the time machine at the beginning of the lesson ?

* Would you give some more details about that place and the year; the architecture, life styles, important events ?
* Would you connect the architecture, life styles and important events with the weather conditions and /or climate ?

**Optional Tip:** For larger group sizes, divide the audience into smaller sub-groups of 3-4 people. Ask someone in the group with good graphic recording skills to record the answers visually and have a history gallery.