# Climate Change & Disaster Management

Understanding Impacts & Using Climate Data for Response Planning

# Objectives

By the end of this session, participants will:

- Understand the basics of climate change
- Recognize global and European impacts
- Explore a real case (September 2024 flood)
- Learn how to interpret climate & weather data
- Apply insights to disaster management decisions

# What is Climate Change?

- It refers to the long-term changes in temperature and weather patterns (warmer summers over decades)

- It is mainly caused by human activities, especially burning fossil fuels

Key idea: Climate ≠ Weather

# Climate vs Weather

1

**Weather:**

- Short-term patterns (hours to days)
  Example: rain today

2

**Climate:**

- Long-term patterns (years/decades)
  Example: warmer winters in Europe

# Causes of Climate Change

- Greenhouse gas emissions (mostly caused due to human activities) ($CO_2$, methane)
- Energy production
- Transportation
- Deforestation
- Result: Increased heat trapped in atmosphere

# Global Impacts

1. Rising temperatures
2. More extreme weather Events (increasing frequescies)
3. Sea level rise
4. Droughts and floods

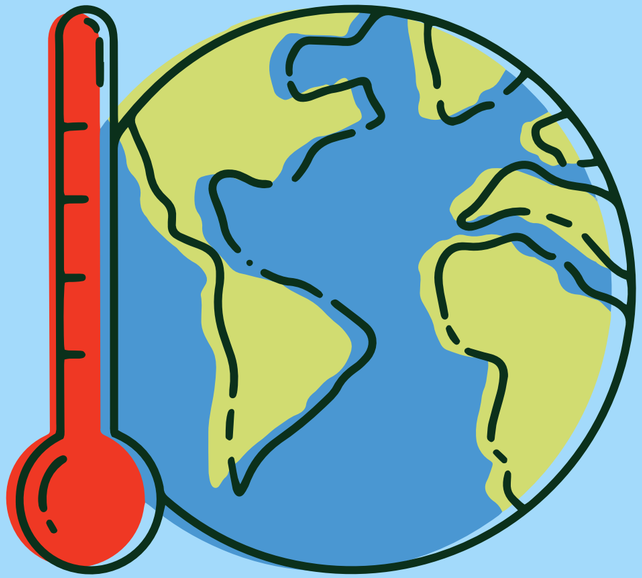
# Climate Change in

**Europe**:

- Increased heatwaves
- More intense rainfall events
- Floodrisksincreasing
- Alpine glacier melting

**Austria**:

- Rising average temperatures
- More frequent heavy rainfall
- Increased flood risk
- Impact on forests and agriculture



# Why It Matters for Disaster Management

1. Events are becoming more frequent
2. Harder to predict patterns
3. Greater need for preparedness
4. Climate change = risk multiplier

# Case Study: September 2024 Flood

- Heavy and persistent rainfall
- Rivers exceeded capacity
- Infrastructure damage
- Emergency response required

# Lessons from the Flood

- Importance of early warning systems
- Need for coordinated response
- Role of local authorities
- Community preparedness is critical

# Introduction to Climate Data

Climate data helps us understand trends and risks (data helps us see patterns)

Examples:
- Temperature records
- Rainfall data
- River levels

What is Climate Data Used For?

- Identifying long-term trends
- Risk assessment
- Planning infrastructure
- Supporting policy decisions

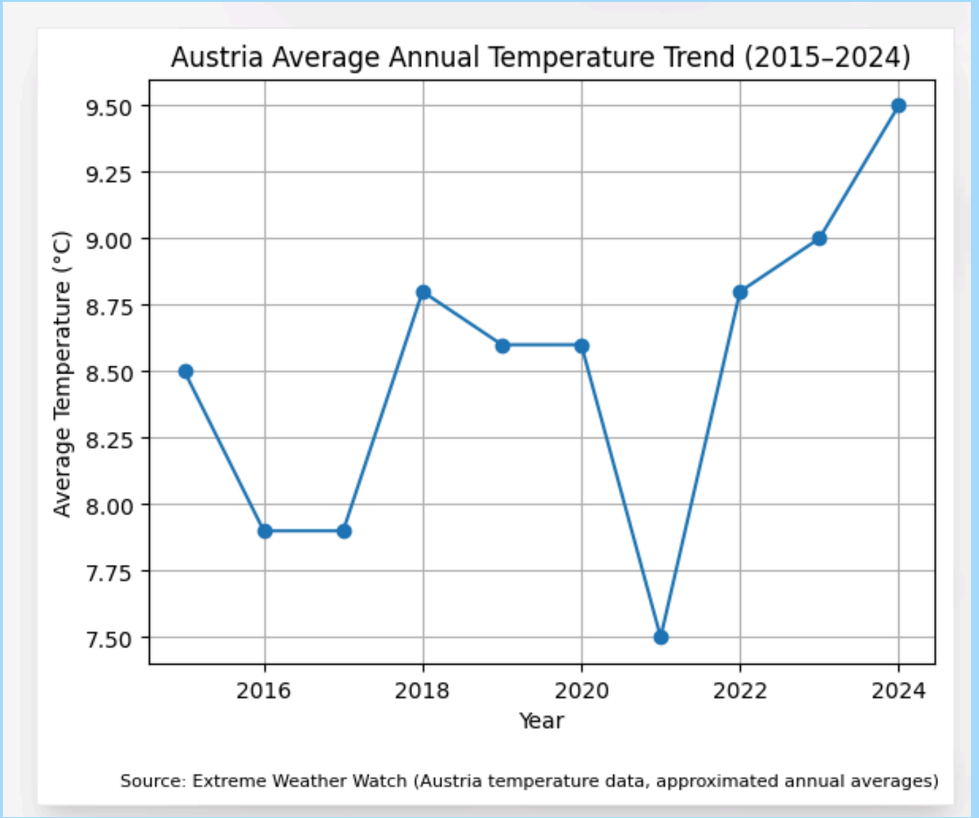
# Understanding Simple Climate Graphs

Temperature trends over time
Rainfall patterns

Focus on:
- Increasing trends
- Extreme peaks

# Austria's Climate Graph

| Year | Rank | High (°C) | Low (°C) |
|---|---|---|---|
| 2024 | 1 | 13.9 | 5.0 |
| 2023 | 2 | 13.5 | 4.4 |
| 2022 | 3 | 13.5 | 4.0 |
| 2021 | 21 | 12.0 | 2.9 |
| 2020 | 7 | 13.2 | 3.9 |
| 2019 | 5 | 13.3 | 3.9 |
| 2018 | 3 | 13.5 | 4.0 |
| 2017 | 13 | 12.4 | 3.4 |
| 2016 | 14 | 12.2 | 3.6 |
| 2015 | 8 | 13.1 | 3.9 |
| 2014 | 6 | 12.9 | 4.2 |




## What Was the Hottest Year in Austria?

2024 was the warmest year in the history of Austria. The average daily high temperature was 13.9 °C, and the average low was 5.0 °C.

# What Are Climate & Weather Models?

**Climate Models**:

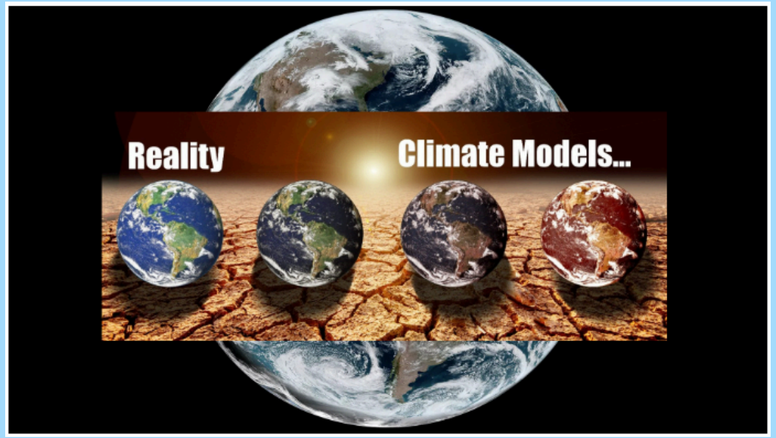
Tools used to simulate future climate, based on scientific data and assumptions

They show possible futures, not exact predictions and are used to prepare for different outcomes.

**Weather Models**:

Tools used for short-term forecasts (apps)

They predict rainfall, storms, temperature.



# Climate Models vs Weather Models

**Climate Models:** long-term trends Vs **Weather Models:** short-term forecasts

- Important: Both are important for disaster management

**Limitations of Climate Models:**

1. Uncertainty exists (models are not perfect)
2. Results depend on assumptions, but still useful (valuable) for planning and preparedness

# Using Weather Data for Disaster Response

- Monitoring rainfall forecasts
- Tracking storms
- Identifying early warning signals (heavy rain forecast → prepare sandbags)

**Early Warning Systems:**
Alerts, sirens, apps can save lives

- Combine data + models
- Provide alerts to authorities and public
- Goal: Reduce damage and save lives

# Decision-Making with Data

Data helps answer these key questions:

? What is likely to happen?
When?
How severe it is going to be?

**Important**: Timing and accuracy are important especially in crisis situations.
**Example Scenario**:
Heavy rainfall forecast for the next 3 days

? Should evacuation be considered?
Which areas are at risk?
What resources are needed?

# Roles to Play

**Local Authorities**:

- Monitoring risks
- Communicating warnings
- Coordinating emergency response

(Coordination & Responsibility)

**Local Communities**:

- Awareness and preparedness
- Following warnings
- Supporting vulnerable groups

(individual responsibility)


- Climate change increases disaster risks
- Data and models support decision-making
- Early action is critical


"We cannot stop all disasters, but we can reduce their impact through knowledge and preparation."

# Thank You