

E.C.O.S

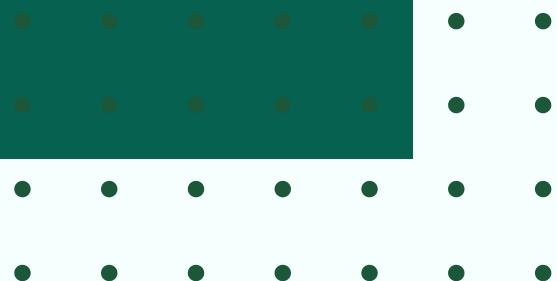
ENVIRONMENTAL COMPUTATION
AND OBSERVATION SYSTEM



Faculty : Sir Aseef Ahmed

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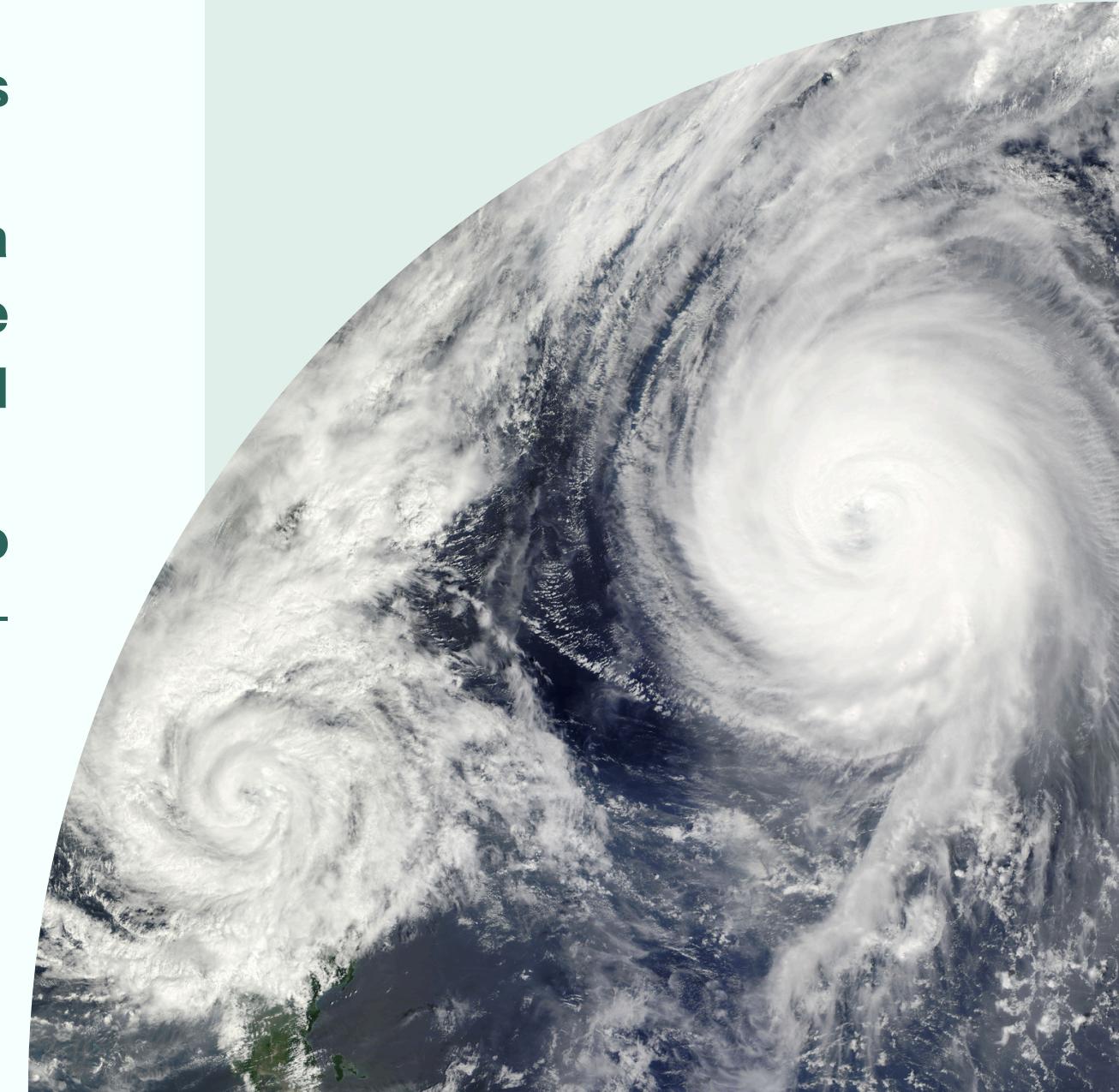
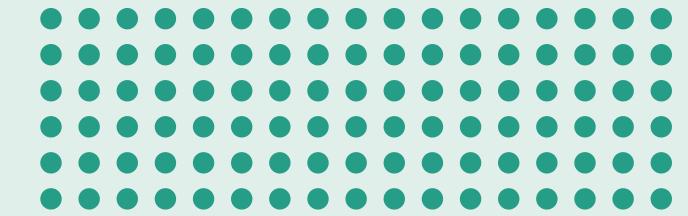
Introduction

Understand the environmental threats posed by climate change due to factors like greenhouse gas emissions, deforestation, and land use changes (Big Data-E.C.O.S).

Highlight how E.C.O.S aims to address these challenges through big data-driven climate monitoring.

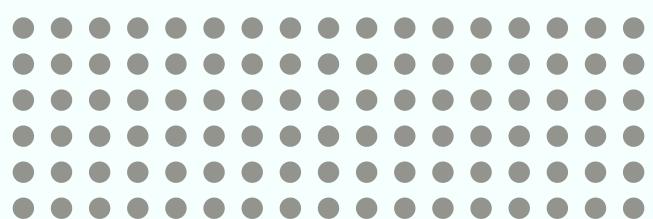
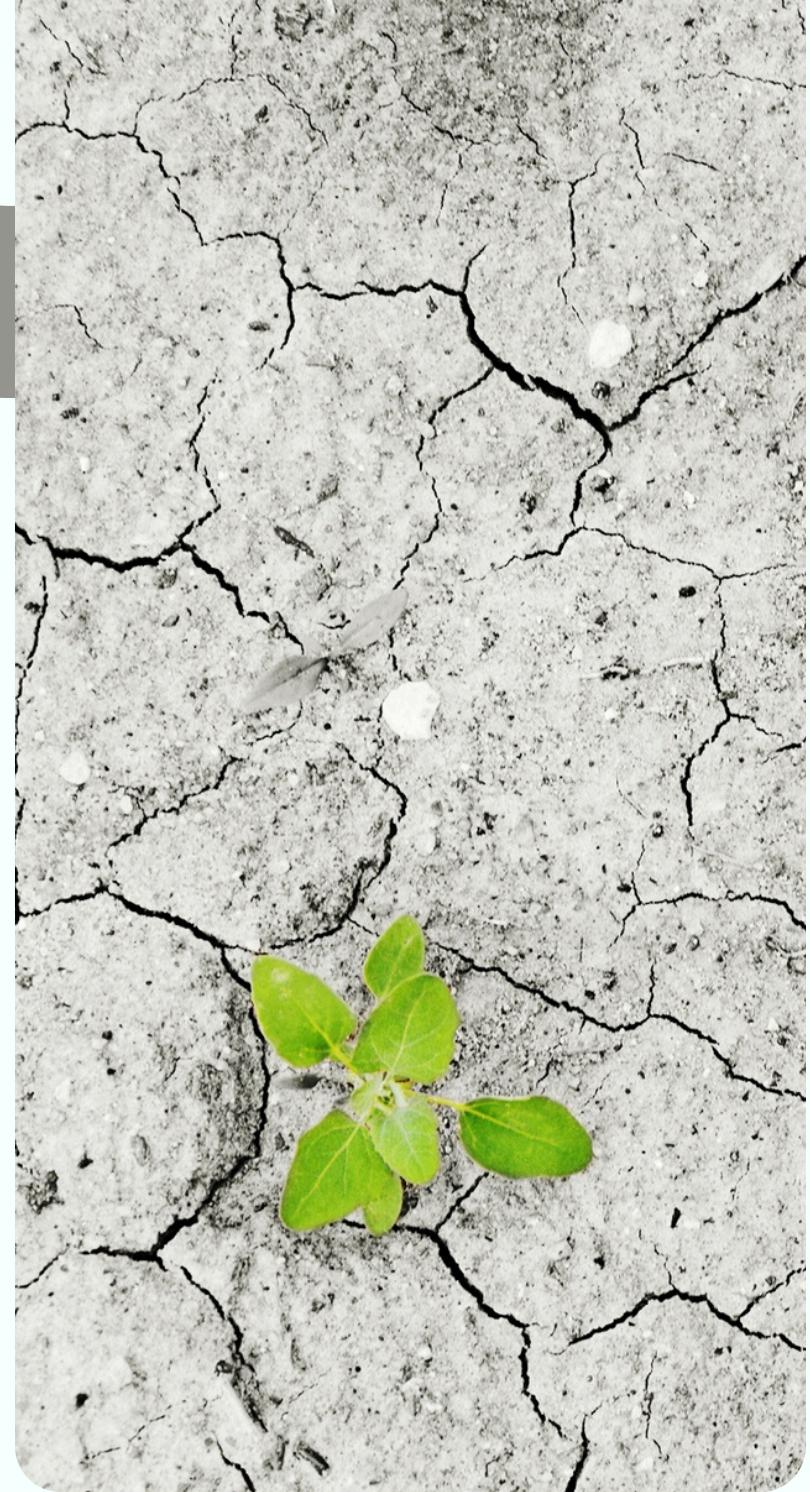
Show how the EarthScape Climate Agency requires a robust solution to process, analyze, and visualize large climate datasets from satellites, weather stations, and sensors.

E.C.O.S integrates Hadoop-based technologies to generate insights for informed environmental decision-making (Big Data-E.C.O.S).



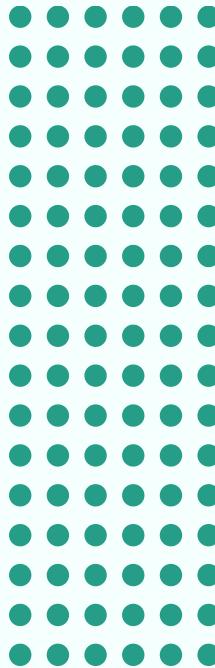
Objective

- **Describe the key goals of E.C.O.S such as enhancing climate data analysis and enabling real-time observation (Big Data-E.C.O.S).**
- **Demonstrate how this project empowers agencies to respond proactively to environmental risks.**
- **Show how students apply big data tools in real-life climate monitoring scenarios and develop advanced data-handling skills.**





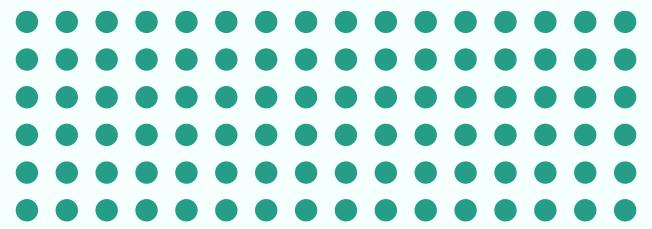
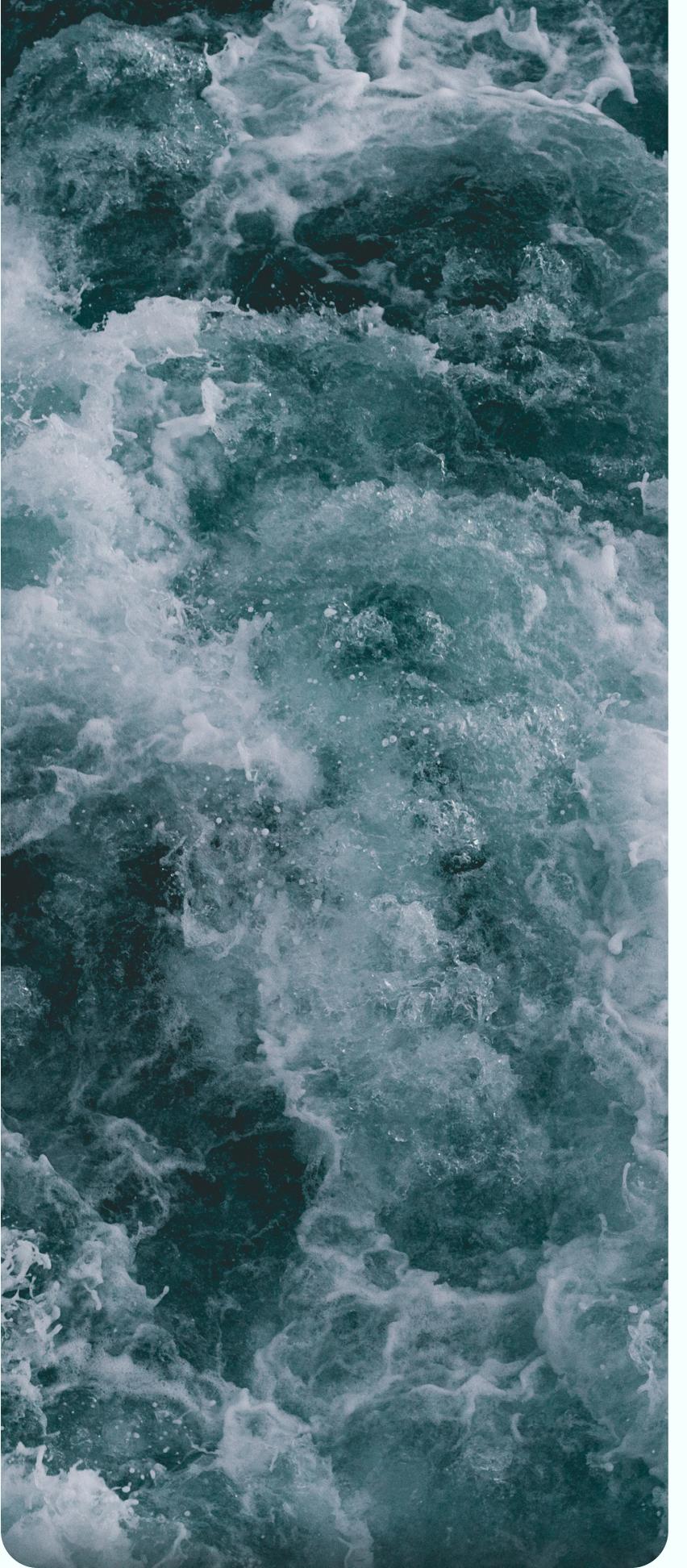
Problem Statement



- **Identify environmental monitoring challenges like fragmented data sources, lack of real-time analysis, and limited visualization tools (Big Data-E.C.O.S).**
- **Explain how E.C.O.S overcomes these problems using scalable big data infrastructure and machine learning models to track and predict environmental trends effectively.**

Project Scope

- Define the scope to include features such as user authentication, climate data ingestion, real-time analytics, machine learning prediction, and visualization dashboards (Big Data-E.C.O.S).
- Highlight the outcomes like anomaly detection in climate data, prediction of extreme weather events, and optimized environmental reporting.



System Architecture

- Provide an overview of E.C.O.S system architecture.
- Include flowcharts and block diagrams to illustrate how data is collected, processed, stored, and visualized (Big Data-E.C.O.S).
- Explain the use of Hadoop, ML algorithms, and real-time processing tools in climate analytics.



Functional Requirements

- Mention all system functionalities including secure user login, uploading of sensor/satellite data, execution of processing pipelines, and displaying dashboards (Big Data–E.C.O.S).
- Ensure these components fulfill the objectives of real-time monitoring, prediction, and anomaly detection.



The background of the slide features a photograph of a modern office space. The room is filled with natural light from large windows on one side. The interior design is minimalist and eco-friendly, with numerous green plants hanging from the ceiling and placed throughout the room. There are several wooden tables and chairs, some of which are occupied by people. The ceiling is made of white pipes and beams, adding to the industrial-chic aesthetic. In the foreground, there are blurred shapes of people, suggesting a busy office environment.

NON-FUNCTIONAL REQUIREMENTS

- Discuss non-functional aspects like data accuracy, system uptime, secure handling of large data, and scalability (Big Data-E.C.O.S).
- Mention compliance with environmental data regulations and optimization strategies for performance.

Technology Stack

Hardware: Minimum i5 processor, 16 GB RAM, 500 GB SSD (Big Data-E.C.O.S)

Software:

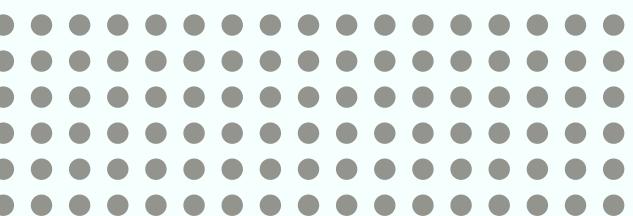
- Hadoop Ecosystem (HDFS, MapReduce)
- Jupyter Notebook
- MongoDB
- Python (Pandas, Scikit-learn)
- Tableau / Power BI
- Apache Spark
- Sensor data parsers and APIs



Installation Guide

Provide step-by-step instructions to install and configure:

- Hadoop & HDFS
- Jupyter and required Python libraries
- MongoDB setup
- Dashboard and visualization tools
- Integration with data sources (sensors, APIs)





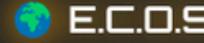
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User Instructions

Explain how users can:

- Register and log in to the system
- Upload environmental datasets
- Trigger processing tasks
- View analytics through graphs and maps
- Interpret model predictions and receive alerts (Big Data-E.C.O.S)

Index Page

 E.C.O.S

Home Login Register Feedback



11:55:12 AM
Good Morning, Guest!

Welcome to E.C.O.S:

Environmental Computation and Observation System

Explore climate & time-based dynamic visuals.

[Get Started](#)



Data Visualization

Interactive graphs to explore climate patterns and predictions.

[View Visualization](#)



Machine Learning Models

Advanced models to predict climate trends and anomalies.

[View Models](#)



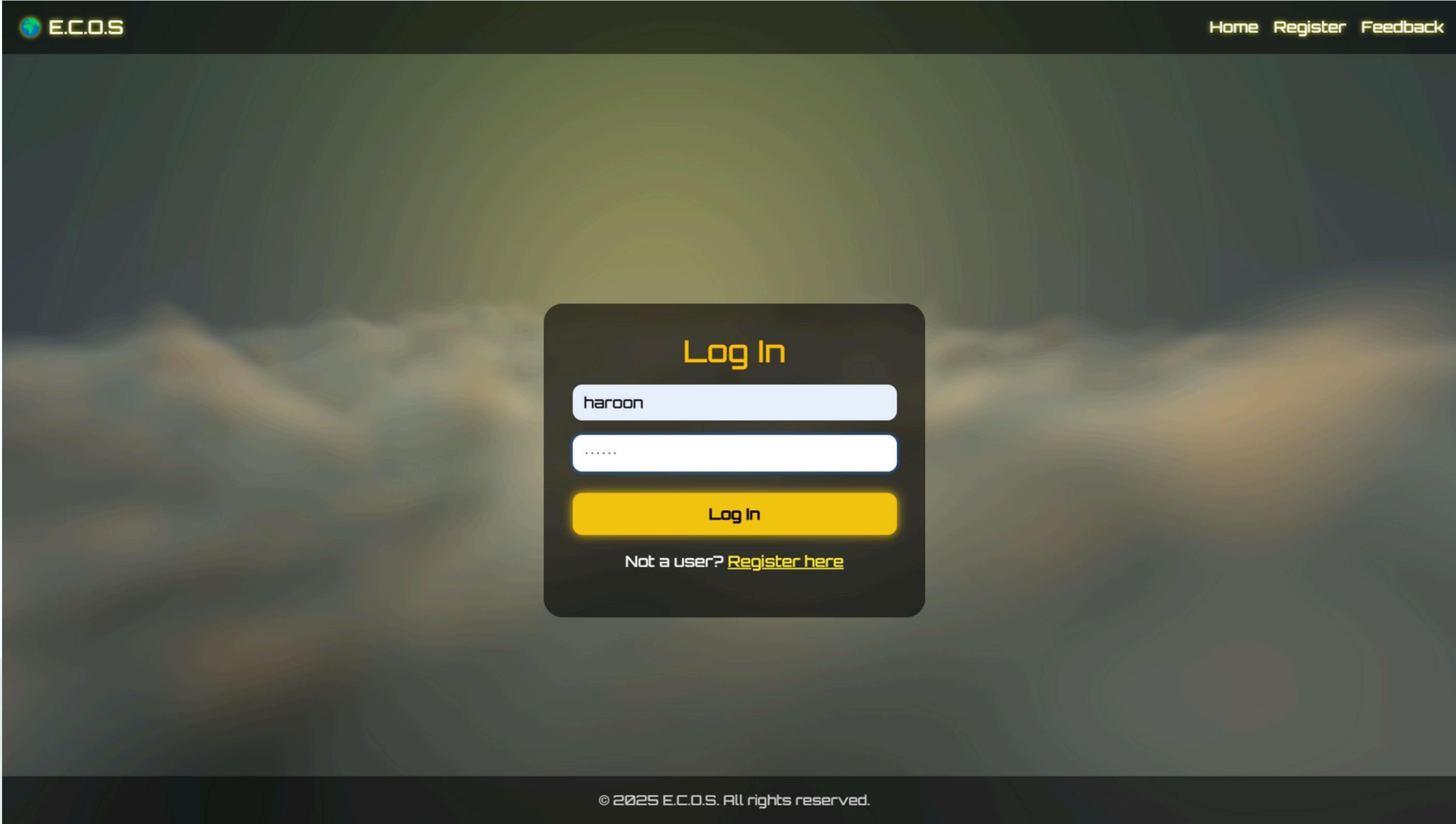
Real-time Notifications

Stay informed about climate anomalies with instant alerts.

[View Notifications](#)

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Login Page



The image shows the login page of the E.C.O.S. website. The background features a dark green header bar at the top and a dark gray footer bar at the bottom. The main content area has a dark gray background with a subtle yellow and orange wavy pattern. In the center, there is a dark gray rectangular login form with rounded corners. At the top of the form, the word "Log In" is written in a yellow font. Below it are two input fields: the first contains the text "haroon" and the second contains several dots ("....."). At the bottom of the form is a yellow "Log In" button with black text. Below the form, the text "Not a user? [Register here](#)" is displayed in a small white font. In the top left corner of the header, there is a small globe icon followed by the text "E.C.O.S.". In the top right corner, there are three links: "Home", "Register", and "Feedback", all in a small white font.

E.C.O.S.

Home Register Feedback

Log In

haroon

.....

Log In

Not a user? [Register here](#)

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Registration Page

The image shows a registration page for a system named E.C.O.S. The background features a dark green header bar at the top and a dark gray footer bar at the bottom. The main content area has a dark gray background with a subtle wavy pattern. In the center, there is a dark gray rectangular form with rounded corners. At the top of this form, the text "Create Your E.C.O.S Account" is displayed in a yellow font. Below this, there are three input fields: the first contains the text "haroon", the second contains "haroon@gmail.com", and the third is partially visible with only dots and a cursor shown. At the bottom of the form is a large yellow button with the word "Register" in black text. Below the form, a link "Already have an account? [Log in here](#)" is visible. The top left corner of the page features the E.C.O.S. logo, which includes a small globe icon and the text "E.C.O.S". The top right corner contains links for "Home", "Login", and "Feedback". The bottom footer bar contains the copyright notice "© 2025 E.C.O.S. All rights reserved."

E.C.O.S

Home Login Feedback

Create Your E.C.O.S Account

haroon

haroon@gmail.com

.....

Register

Already have an account? [Log in here](#)

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Visualization Page

The screenshot shows the E.C.O.S visualization interface. At the top left is the logo "E.C.O.S". At the top right are links for "Home", "Welcome, haroon", "Logout", and "Feedback".

Choose Visualization
Select variables or view correlation to explore the climate dataset.

Select a Variable: Temperature

Visualize

Correlation Matrix
Show Matrix

Compare Multiple Variables
Select up to 3 variables
Temperature, Humidity, CO2 Levels
Hold Ctrl (Windows) or Cmd (Mac) to select multiple.

Compare

Prediction Page

The screenshot shows the 'Climate Prediction' page within the E.C.O.S application. At the top left is the E.C.O.S logo, which consists of a small globe icon followed by the text 'E.C.O.S'. To the right of the logo is a navigation bar with links: 'Home', 'Welcome, haroon', 'Logout', and 'Feedback'. The main content area has a dark background with a subtle map-like pattern. In the center, there is a title 'Climate Prediction' with a small globe icon to its left. Below the title is a subtitle 'Select a location to view climate trends.' Underneath the subtitle are two dropdown menus. The first dropdown is labeled 'Country' and contains the placeholder text 'Select a country'. The second dropdown is labeled 'City' and also contains the placeholder text 'Select a city'. At the bottom of the form is a green button labeled 'Get Prediction'.

Notification Page

 E.C.O.S

Home Welcome, haroon Logout Feedback

Global Climate News



Kelvin Kinuthia Showcases Weight Loss Through Ozempic: "Swimsuit Body"

Kelvin Kinuthia revealed he lost 5kg in just one week after starting Ozempic shots and is excited to continue his weight loss journey.

[Read More](#)



În luna aprilie au fost depășite în România și recorduri meteo de frig de la 1949

Luna aprilie a fost una „cu două fețe” în România, au fost și zile de iarnă și apoi de vară, mai ales în Transilvania. Luna trecută a fost

[Read More](#)



Alternō Raises Series A Funding to Scale Sustainable Heat Technology for a Zero-Emission Future

Alternō, a climate-tech startup founded in 2023, has closed its Series A funding round to accelerate the deployment of its

[Read More](#)



FOX NFL
BEST GAMES ON FOX

AT
CINCS AT
KC



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Feedback Page

The image shows a feedback form titled "We Value Your Feedback" against a dark background with a subtle green and yellow abstract pattern. The form includes fields for "Your Name", "Your Email", and "Your Message", each with a corresponding input box. A large yellow button at the bottom is labeled "Send Feedback". The top navigation bar features the E.C.O.S logo, a "Logout" link, and a "Feedback" link.

E.C.O.S

Home Logout Feedback

We Value Your Feedback

Your Name

Your Email

Your Message

Send Feedback

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Conclusion

- Summarize the importance of E.C.O.S in supporting data-informed environmental policies and climate change mitigation.
- Reinforce the value of combining Big Data with environmental science for proactive, real-time climate decision-making.

THANK YOU!

