IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 3, November 2025
Impact Factor: 7.67

Advanced Meteorological Data Processing and Visualization Platform

Prof. Aditya Lavhale, Ms. Minal Deshmukh, Ms. Chetna Nagpurkar
Dept. Computer Science & Engineering,
Tulsiramji Gaikwad Patil College of Engineering and Technology, Nagpur, Maharashtra, India.
adityalavhale@gmail.com, deshmukhminal@970@gmail.com
chetananagpurkar7@gmail.com

Abstract: *The Advanced Meteorological Data Processing and Visualization Platform offers a complete solution for handling atmospheric data by combining modern technology with user-friendly web interfaces. It uses Java, Spring Boot, and Spring Data JPA to automatically get and process weather data from outside sources. This makes sure the data is accurate, can handle a lot of information, and provides real-time weather predictions. On the front end, the system uses animated data visuals and a modern glassmorphism design, along with strong input checks, to create an engaging experience for scientists and the general public.*

The platform's structure is made up of separate parts that work together smoothly, from when users enter information through RESTful API calls, to when the data is cleaned in the back end and displayed on the front end.

This setup supports combining different data types, doing advanced processing, and offering interactive analysis, which helps in both operational tasks and research in meteorology. By improving workflows, storing data long-term, and using dynamic visualization techniques, the platform gives society and academic groups reliable information for planning, managing risks, and studying climate patterns.

Keywords: Meteorological data processing, Spring Boot, Java, RESTful API, atmospheric visualization, real-time forecasting, glass morphism UI, operational meteorology, interactive analytics, ensemble data fusion, weather data automation

DOI: 10.48175/IJARSCT-29890