

# Prajeesh Ag

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## Experience

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### Climate Change Center, KAUST, Research Specialist

Jeddah, KSA  
Jan. 2023 to present

- Developed a regional coupled climate model tailored for subseasonal to seasonal scale forecasting across the Arabian Peninsula region. Integrated WRF and MITgcm through ESMF coupler, optimizing performance and accuracy
- Crafted a Command-Line Interface (CLI) preprocessing utility in Python, streamlining data generation, manipulation and visualization for the coupled model, enhancing efficiency and ease of use
- Orchestrated a fault-tolerant automated workflow, leveraging CycL workflow engine to manage a 50-member ensemble system for seasonal prediction over the Arabian Peninsula

### Indian Institute of Tropical Meteorology, Scientist-D

Pune, India  
Jan. 2020 to Dec. 2022

- Pioneered a groundbreaking spectral dynamical core for the atmospheric model of IITM-ESM, enabling 2D domain decomposition in both spectral and grid point domains using FFTW library. This innovation vastly improved scalability and throughput.
- Engineered a high-resolution (6km) global forecast model ([HGFM](#)) for Short Range Forecasting by implementing a novel TCO grid in the GFS model TCO grid, enhancing prediction accuracy and resolution.
- Implemented MPI parallelization in the Ocean Dynamics Thermodynamic Model ([ODTM](#)), boosting model throughput by up to 30 times, thus accelerating simulations and analysis.
- Investigated Monsoon, IOD, and ENSO phenomena, employing CMIP6 data to elucidate interactions and feedback mechanisms, with publications in peer-reviewed journals
- Directed a team of 3-4 scientists in the development and enhancement of IITM-ESM, overseeing project milestones and ensuring alignment with research objectives.

### Indian Institute of Tropical Meteorology, Scientist-C

Pune, India  
Jan. 2016 to Dec. 2019

- Managed and oversaw the CMIP6 experiments conducted with IITM-ESM.
- Orchestrated production workflows essential for CMIP6 simulations of IITM-ESM on High-Performance Computing (HPC) systems
- Architected an intuitive and modular I/O manager for IITM-ESM, harnessing modern Fortran's Object-Oriented Programming (OOP) capabilities alongside NetCDF4, facilitating data handling and interoperability.
- Spearheaded the implementation of fractional grid for surface flux computation, resolving flux-transfer inconsistencies over sea-ice and land-ocean boundaries. This enhancement significantly bolstered sea-ice simulations ([Swapna et al., 2018](#)).
- Developed post-processing software in Python, C, and Fortran, leveraging NetCDF4 and GRIB libraries to streamline data analysis and visualization workflows.
- Conducted climate change analysis, contributing to understanding of anthropogenic influences on climate dynamics

### Indian Institute of Tropical Meteorology, Scientist-B

Pune, India  
Jan. 2013 to Dec. 2015

- Engineered concurrent coupling using FMS coupler to enhance the throughput of the IITM-ESM model, optimizing resource utilization and computational efficiency.

- Identified and resolved memory leak issues in the IITM-ESM using Valgrind, ensuring model stability and reliability.
- Conducted comprehensive performance analysis of IITM-ESM using Allinea MAP, pinpointing and addressing bottlenecks to optimize overall performance and efficiency.

## Education

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	<b>University of Pune</b> , Atmospheric Science	Apr. 2018 to Mar. 2024
<b>PhD</b>	<ul style="list-style-type: none"> <li><b>Thesis:</b> Indian Ocean Dipole variations in a warming climate and associated linkages to monsoon and marine primary productivity (<a href="#">pdf</a>)</li> <li><b>Course work:</b> Earth System Sciences and Climate, Physics &amp; Chemistry of Atmosphere, Weather, Climate &amp; General Circulation, Geophysical Fluid Dynamics, Statistical Methods, Large scale Air-sea Interaction, Observational Techniques</li> <li>Used advanced statistical techniques such as cross-correlations, principal component analysis, significance tests and anomaly composites</li> </ul>	
	<b>Cochin University of Science and Technology</b> , Physical Oceanography	May 2008 to Apr. 2010
<b>MSc</b>	<ul style="list-style-type: none"> <li><b>Main Subjects:</b> Physical Oceanography, Ocean Observation, Coastal and Estuarine Oceanography, Computer Programming, Ocean Modelling, Ocean Engineering</li> <li><b>Marks:</b> 7.84/10 (<a href="#">Transcript</a>)</li> </ul>	

## Additional Experience And Awards

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**Instructor (2015 - 2022):** Taught Computer Application for Climate Science course.

**Web Development:** Developed a football tournament web application using Django web framework with the facility of team and player registration, player transfer, match scheduler, on-ground score and match details entering, player and team statistics, and dynamic standings table

**JRF-Fellowship, UGC-CSIR:** Awarded JRF Fellowship from UGC-CSIR

## Skills

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**Languages:** Fortran (proficient), Python (proficient), Bash (proficient), C (Familiar), JavaScript (Prior Experience)

**Data Formats:** NetCDF4, GRIB1/2, JSON, XML, Binary, ASCII, YAML

**High performance computing:** Parallel Programming (MPI, OpenMP), Job Schedulers (Slurm, PBS, LSF)

**Data processing and Visualization:** CDO, NCO, Matplotlib, Cartopy, Xarray, Pandas, Iris.cube, NCL

**Software Libraries and Tools:** Linux OS, Git, GitHub, Cyc Workflow Engine, Debuggers and Profilers, [Earth System Modeling Framework](#), [Flexible Modeling System](#), [FFTW](#)

## Publications

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For a list of my academic publications, please visit my [Google Scholar profile](#)