

CAREERS FOCUS: Climate Science

My journey as a CLIMATE SCIENTIST

Dr Ramontsheng Rapolaki, Lead Scientist: Marine at the South African Weather Service



I grew up in Ladybrand, in a township called Manyatseng, in the Free State. My early childhood was spent on a farm near Ladybrand, and I later relocated to Mauersnek before settling in Manyatseng. I completed all my schooling there, attending New Vale Primary School, Le Roux Primary School, and Le Reng Secondary School. I was fortunate to have excellent teachers and supportive family members who helped shape me into a hard-working student.

As a child, I aspired to various professions I was exposed to, including teaching, policing, farming, engineering and medicine. I grew up believing that I could achieve anything I set my mind to. My family and teachers encouraged my aspirations, helping me to believe in my

potential. As a result, I did well in all subjects, despite not having a favourite. In grade 10, I chose to study science subjects because they offered flexibility for future career choices.

I decided in grade 8 that I wanted to attend the University of Cape Town (UCT) after completing grade 12. This goal motivated me to work hard to gain admission. When I reached matric, I applied to only two universities: UCT and the University of KwaZulu-Natal (UKZN). Both universities accepted me.

I initially wanted to be a geologist and enrolled for a Bachelor of Science (BSc) at UCT, majoring in geology and geographical and environmental sciences. I struggled with geology, especially geochemistry. In my second year, I decided to pursue ocean and atmosphere science as my third major, and I quickly became interested in it. I graduated with a BSc, double majoring in ocean and atmosphere science, and geographical and environmental science.

Following my undergraduate studies, I pursued an honours degree specialising in ocean and atmosphere science, focusing on the 2014 cut-off low-pressure system. I then went on to earn an MSc in ocean and climate dynamics, focusing on numerical simulations of Tropical Storm Chedza, as a MasterCard Foundation Scholar.

Following a two-month internship at the National Research Foundation (NRF)-South African Environmental Observation Network (SAEON) Egagasini node, I enrolled in a PhD programme in ocean and atmosphere science. My PhD research focused on heavy rainfall events over the Limpopo River Basin in Southern Africa, including the moisture sources and pathways, as part of the Professional Development Programme at UCT and NRF-SAEON Egagasini node.

After completing my PhD, I was offered a postdoctoral lectureship in ocean and atmospheric dynamics at UCT, as well as a research fellowship on the LaunchPAD project (a UK Oxford University project). This was followed by a postdoctoral research fellowship at the NRF-SAEON.

I then relocated to Pretoria to work as an agrometeorology and climate change researcher for the Agricultural Research Council (ARC). Later, I joined the South African Weather Service as a lead marine scientist based in Cape Town.

My experience and interests in the field involve investigating multiple timescales, from weather to climate, with studies in marine sciences, agriculture and atmospheric sciences, as well as numerical modelling. This diversity highlights the breadth and complexity of the field, and there are many options available!

'It's exciting to use ADVANCED CLIMATE MODELS'

Siyabonga Nozwane, Research Scientist: Climate Change and Variability, South African Weather Service



As a junior research scientist at the South African Weather Service, I focus on understanding Climate Change and variability, particularly how these changes impact weather patterns and extreme weather events. My work involves analysing data from global climate

models to project future climate scenarios and assess how rising temperatures and changing rainfall patterns could affect regions like South Africa.

One of the most exciting parts of my job is using advanced tools, like computer models and climate data analysis software, to study trends and provide insights that can help communities and policymakers better prepare for the impacts of Climate Change. I also engage with various stakeholders, such as national and provincial governments, municipalities, the private sector, climate-sensitive industries, schools and communities to share findings and support the development of effective climate adaptation strategies.

What do we mean by a career in Climate Science?

Careers in Climate Science focus on understanding the biological, chemical and physical processes that affect Earth's climate. Another key objective is finding

ways to reduce how human activity impacts the land, seas, atmosphere, ice sheets and other environmental elements. In practice, Climate Science covers a broad spectrum of activities, and due to the complexity of climate systems, a variety of methods, tools and approaches are needed to study them. As a result, Climate Science intersects with numerous fields, such as atmospheric science, computer science, chemistry, geology, natural science, physics, oceanography and statistics.

What careers are there in Climate Science?

Climate Science offers a wide range of career opportunities across many industries. These careers may involve fieldwork, laboratory research, data analysis, policy development, and public engagement or teaching, among other things. The specific path often depends on your interests, educational background and desired industry. The following are some popular career paths in the field:

- **Research scientist/climatologist:** Conduct research on climate systems, analyse climate data, develop models, and study the impacts of climate change and variability.
- **Climate modeller:** Develop and run computer models to simulate climate systems and predict future climate scenarios.
- **Atmospheric scientist:** Study atmospheric phenomena, including weather patterns and climate dynamics.
- **Environmental consultant:** Provide expertise on environmental issues, including climate change, to help organisations comply with regulations and develop sustainability strategies.
- **Climate policy analyst:** Analyse and develop policies related to climate change mitigation and adaptation, working on legislation, regulations and international agreements.

Climate change advisor: Review and assess policy developments related to climate change. Propose recommendations for actions, including legislative measures, awareness campaigns or fundraising strategies.

- **Sustainability consultant:** Advise businesses and organisations on how to reduce their environmental footprint and implement sustainable practices.
- **Climate change communications specialist:** Develop and deliver messages about Climate Science and policy to the public, media and stakeholders, working on outreach, education and advocacy.
- **Educator/lecturer:** Educate students, communities and organisations about Climate Science and environmental issues through workshops, courses and public talks.
- **Climate finance specialist:** Work on financial mechanisms to fund climate adaptation and mitigation projects, such as carbon trading and green bonds.
- **Marine scientist:** Study the effects of climate change on marine ecosystems and physical oceanographic processes.

High school subjects to consider if you want to study a Climate Science-related qualification at university:

- Geography
- Mathematics
- Physical sciences
- Life sciences

Undergraduate degrees to consider if you want to continue into Climate Science at honours or master's level:

- Atmospheric science
- Environmental and geographical science
- Geography
- Meteorology
- Ocean and atmosphere science