Faculty of Science

Discover your Bachelor of Science Majors

Climate and Weather

science.unimelb.edu.au

THE UNIVERSITY OF MELBOURNE

Climate and Weather

Major in the Bachelor of Science

Study the Earth's climate, climate change (past and future), meteorology, weather forecasting, severe weather, atmospheric chemistry and air quality.

Apply skills in maths, physics, computing, chemistry.

Acknowledgement of Country

The University of Melbourne acknowledges the Traditional Owners of the unceded land on which we work, learn and live: the Wurundjeri Woi-wurrung and Bunurong peoples (Burnley, Fishermans Bend, Parkville, Southbank and Werribee campuses), the Yorta Yorta Nation (Dookie and Shepparton campuses), and the Dja Dja Wurrung people (Creswick campus).

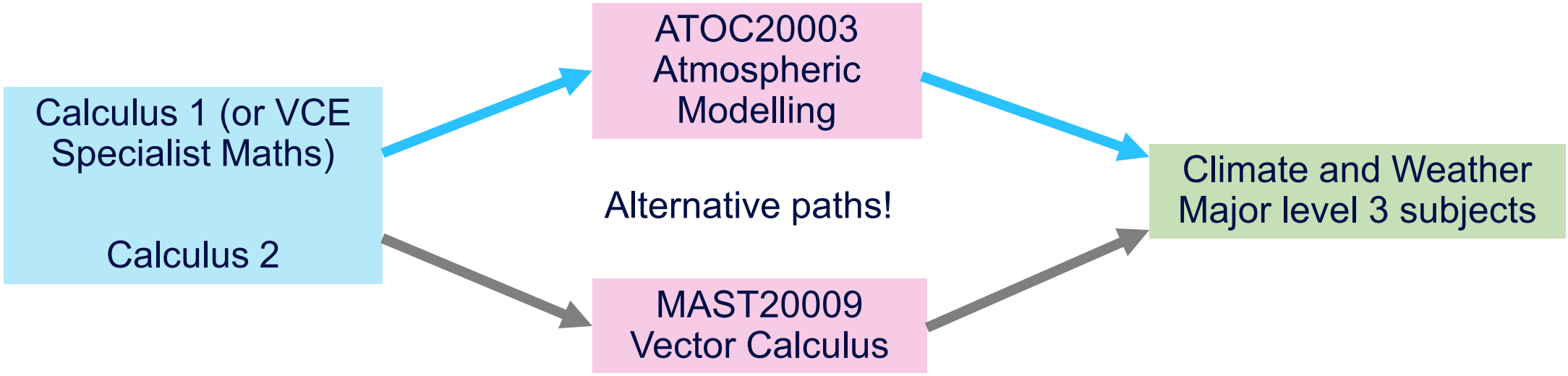
The University also acknowledges and is grateful to the Traditional Owners, Elders and Knowledge Holders of all Indigenous nations and clans who have been instrumental in our reconciliation journey.

We recognise the unique place held by Aboriginal and Torres Strait Islander peoples as the original owners and custodians of the lands and waterways across the Australian continent, with histories of continuous connection dating back more than 60,000 years. We also acknowledge their enduring cultural practices of caring for Country.

We pay respect to Elders past, present and future, and acknowledge the importance of Indigenous knowledge in the Academy. As a community of researchers, teachers, professional staff and students we are privileged to work and learn every day with Indigenous colleagues and partners.

Pathway to a Climate and Weather Major

Other second year electives:
ATOC20001 Weather and Climate Extremes
ERTH20003 Past Climates Icehouse to Greenhouse



https://study.unimelb.edu.au/find/courses/major/climate-and-weather/what-will-i-study/

Climate and Weather Major

	Semester 1	Semester 2
Does not require Calculus 2	ATOC30008 Atmospheric Processes and Composition	ATOC30006 Modern and Future Climate
Requires Calculus 2	ATOC30004 Dynamical Meteorology	ATOC30003 Tropical Weather and Climate Extremes

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Climate and Weather Major

Prerequisites: MAST10006 Calc 2 (or equiv) AND ATOC20003
OR
MAST20009 Vector Calculus (or equiv)

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University of Melbourne Climate and Weather major

ATOC30008 Atmospheric Processes and Composition

Semester 1

Clouds and thunderstorms

Atmospheric Composition

Air pollution and turbulence

Conduct a measurement campaign and analyse the data

Dr Mandy Freund, A/Prof Robyn Schofield, Dr Claire Vincent

ATOC30004 Dynamical Meteorology

Semester 1

Why is the atmosphere how it is?

Mathematics of the atmosphere

Rotating planets

Fronts

High / low pressure system

https://commons.wikimedia.org/wiki/File:Earth_rotation.gif

Prof Craig Bishop

ATOC30006 Modern and Future Climate

Semester 2

Earth's energy balance

Climate change

Atmosphere, ocean, sea-ice, clouds

https://earthobservatory.nasa.gov/features/Sealce

Climate Feedbacks

Sea level rise

Dr Navid Constantinou

ATOC30003 Tropical Weather and Climate Extremes

Semester 2

Tropical atmosphere and ocean

Tropical cyclones

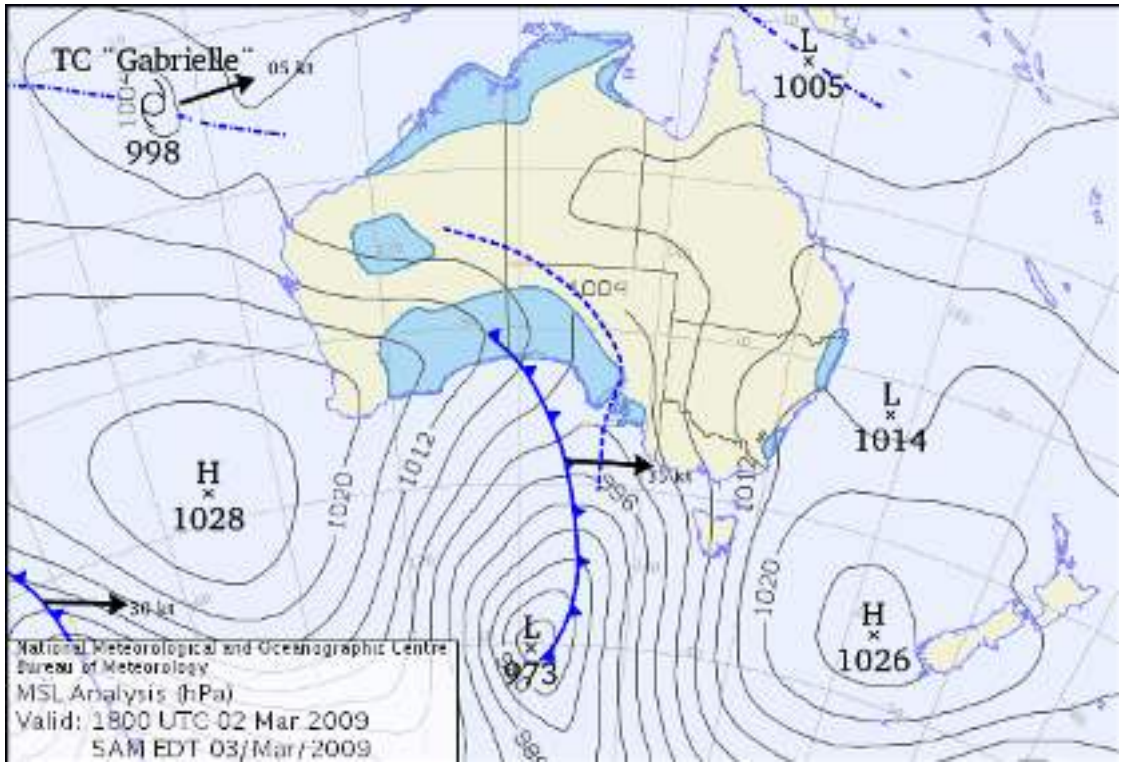
Monsoons

Extreme tropical weather

Tropical waves

Dr Yi Huang

ATOC30004 Dynamical Meteorology and Oceanography



In ATOC30004, we use simple mathematics and physics to understand why the atmosphere/ocean looks and behaves as it does.

How are the winds related to these sea level pressure fields? How does a cold front form?

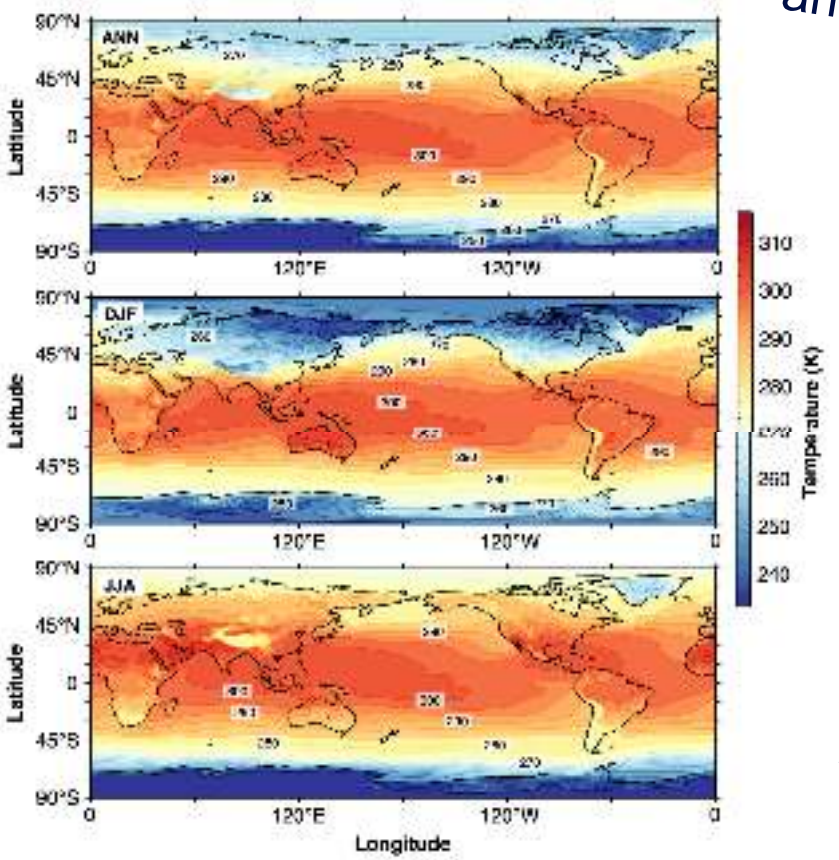
Why are Highs bigger than Lows? Why do they move towards the East (in general)?

What are the implications of the tropics being warmer than the poles for the pressure and wind field 10 km up in the atmosphere?

ATOC30008 Atmospheric Processes and Composition

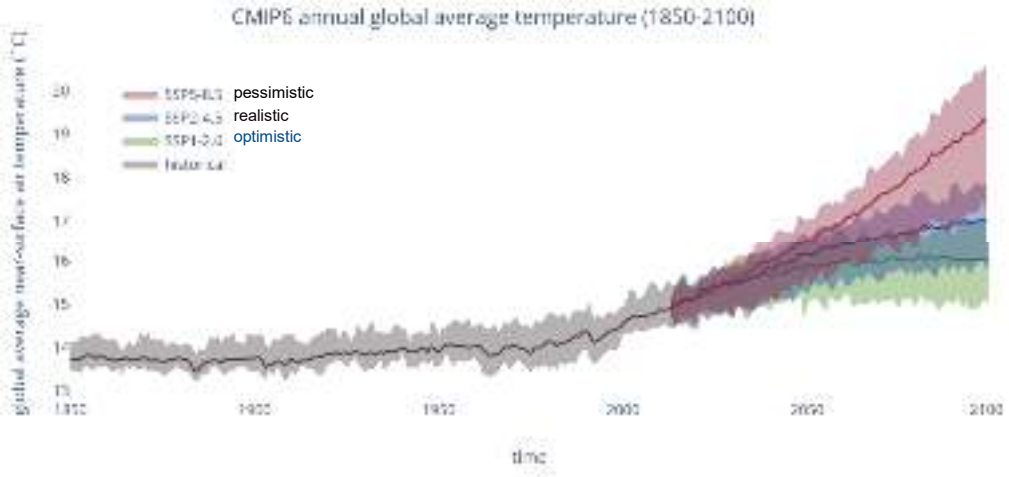
ATOC30006 Modern and Future Climate

Modern *and* the (uncertain) future climate



Surface air temperature in the annual mean (top), DJF mean (middle), and JJA mean (bottom). As is common practice in meteorology, surface temperature here is defined as the temperature 2 m above the surface.

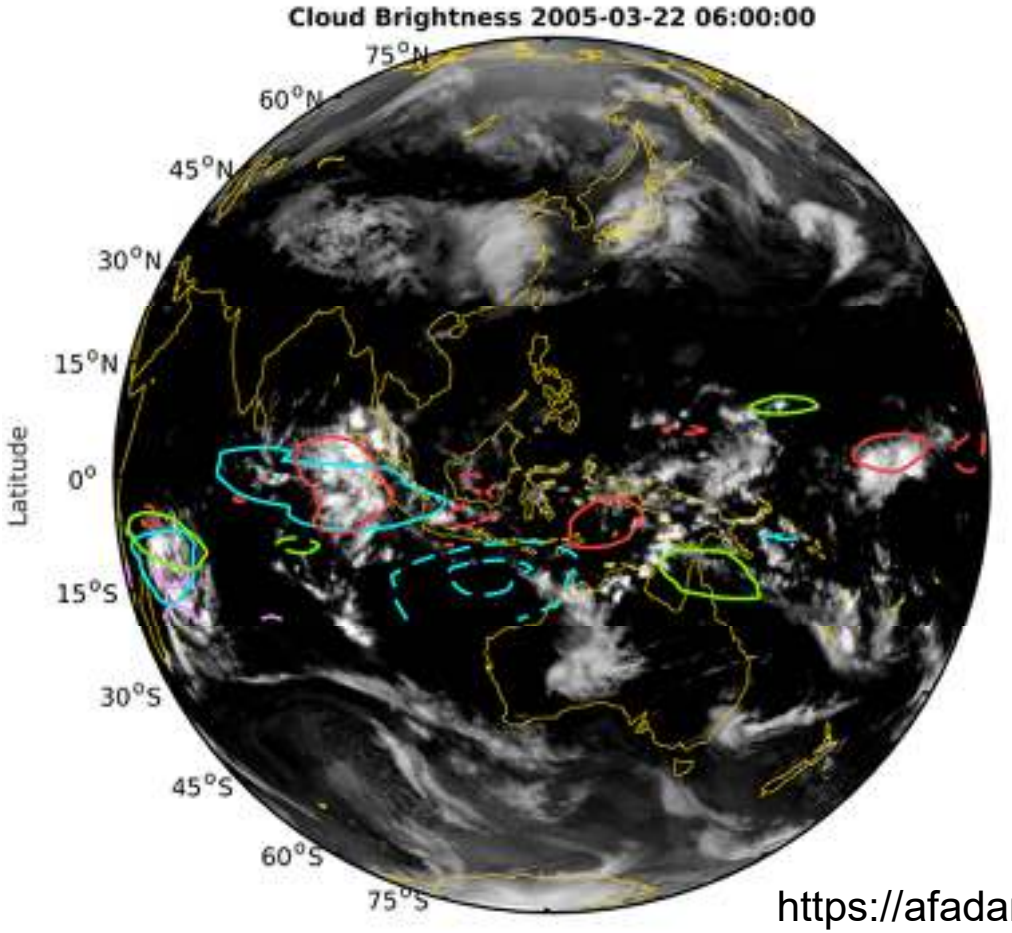
source: Schneider 2023



An illustration based on CMIP6 data available in the CDS showing global mean temperature between 1850 and 2100 for selected CMIP6 models. Grey shade: the range of historical simulations. Coloured shades: potential future temperature change based on different greenhouse gas emission scenarios.

Credit: Copernicus Climate Change Service, ECMWF.

ATOC30003 Tropical Weather and Climate Extremes



https://afadames.com/overview

Animation of satellite-derive cloud brightness with the propagation of equatorial waves included as contoured.

Climate and Weather Jobs

- Weather forecasting (BoM, Weatherzone etc)
- Council, State and Federal Government
- Insurance
- Renewable energy
- Disaster management (fire, flood, drought)
- Private consulting
- Air quality (EPA, private consultants)
- Research (Universities, CSIRO, BoM)
- NGOs
- Model development, programmer

Our major develops the skills you'll need to succeed in diverse careers in weather and climate

- Academic part of eligibility for BoM graduate program
- Coding
- Communication
- Data interpretation
- Problem solving
- 'Real world' problems
- Mathematical and statistical techniques
- Teamwork
- Physical understanding
- Processes driving the weather and climate system

Manager Air Quality - Science
Department of Water and Environmental Regulation

Joondalup, Perth WA (Hybrid)
$146,998 – $157,135 per year

- This is a permanent position
- Attractive Salary
- Flexible working arrangements

Are you someone who can lead and manage the Air Quality Science team within the Air Quality Branch, delivering high-quality scientific assessments

4d ago

Responsible Investments Manager - Climate Change
Hostplus Superannuation

Expiring soon

Melbourne VIC (Hybrid)

- Join a high performing super fund
- Play a pivotal role in advancing Hostplus' commitment to net zero by 2050.
- Fantastic employee benefit scheme

Lead climate risk and sustainability reporting to support Hostplus' net zero goals and strengthen long-term portfolio resilience.

27d ago

Senior Consultant - Climate Risk and Resilience
Anthesis Australia Pty Ltd

Be an early applicant

Melbourne VIC (Hybrid)

Seeking a Senior Consultant for our Climate Risk and Resilience team focused on guiding clients with the Australian Sustainability Reporting Standards

7h ago

What kind of jobs are out there?

What kind of jobs are out there?

Water Science Opportunities
Department of Water and Environmental Regulation

Expiring soon

Joondalup, Perth WA
$112,266 – $142,460 per year

- Competitive annual salary
- Flexible working arrangements available
- Positive workplace culture and environment

The Department is seeking to establish a pool of experienced water and climate specialists to fill vacancies within our Water division.

11d ago

Scientist
Department of Climate Change, Energy, the Environment & Water

Expiring soon

Lidcombe, Sydney NSW (Hybrid)
$109,102.00 to $120,542.00 + super + leave loading

- Temporary opportunity to 30 June 2026 with possibility of extension
- Full-time role at 35 hours per week plus FlexTime
- S&I locations: Lidcombe, Yanco, Newcastle, Grafton, Orange, Wagga Wagga, Albury

Bring science to life as a Wetland Vegetation Scientist safeguarding wetlands and waterways for generations to come!

11d ago

Faculty of Science

Thank You

For more information, come and chat to any of the friendly Climate and Weather teaching staff, or email me at claire.vincent@unimelb.edu.au

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