Summer School on

“Prediction Across Timescales: Predictability Assessment and Communication of Uncertainty for Applications in Environment and Society”

Date: 23-27 February, 2026

Location: Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Buenos Aires, Argentina.

Background

Forecasts on sub-seasonal to inter-decadal timescales have a diverse range of applications in climate services, including disaster preparedness, and short- mid- and long-term planning. However, the complexity of methods, uncertainty assessment and ways to merge forecasts across timescales presents a significant knowledge and skill gap.

The Summer School on Climate Prediction Across Timescales aims to address these gaps, and is designed for early-career researchers and advanced students interested in the science and application of climate predictions. The school will offer foundational and advanced lectures in the mornings and interactive, hands-on lab sessions in the afternoons.

The target audience of the school is: Graduate students and postdocs in atmospheric, climate, and data sciences; and junior researchers and professionals working in climate services or operational prediction. Participants are expected to have a basic background in climate science, statistics, or a related field; proficiency in Python is encouraged but not required.

Objectives and outcomes

- Foster understanding of key concepts including predictability, forecast skill, sources of predictability, and cross-timescale interactions
- Provide an overview of novel tools to determine predictability and assess forecast skill.
- Introduce emerging tools in machine learning and AI for forecasting.
- Develop practical skills through interactive lab sessions focused on real data

Participants will:

- Gain new theoretical and technical skills
- Engage in group discussions and applied exercises with real (i.e. not synthetic) data.

Structure and Tentative Programme

The school will take place over **five days (Monday–Friday)**. Each day will include:

- **Morning sessions**: Theoretical lectures and guided discussions
- **Afternoon sessions**: Hands-on labs or group activities linked to the morning topics

Monday 23 February		
Welcome and introduction		
8.30-9.00	Registration	
9:00-9:10	Welcome (Marisol Osman)	
9:10-9:20	Introduction to Prediction Across Timescales: what, why and how? (Ángel G. Muñoz)	This session gives an overview of climate prediction across timescales, explaining its motivation, goals, and methodologies. Participants will also learn about seamless prediction systems and the current capabilities of state-of-the-art models.
9:20-9:40	Seamless predictions and modelling: state of the art (Ángel G. Muñoz *on behalf of Andrea Molod*)	
9:40-9:55	Introduction to seasonal prediction (Bill Merryfield)	
9:55-10:10	Introduction to subseasonal prediction (Marisol Osman)	
10:10-10:30	Introduction to decadal prediction (Leon Hermanson)	
10:30-11:00	Coffee Break	
Preprocessing forecasts		
11:00-12:00	Systematic errors and error correction (Marisol Osman)	This session focuses on identifying and correcting model biases and statistical calibration methods that improve the accuracy and usability of forecasts.
12:00-12:30	Hands-on: How to download subseasonal and seasonal prediction data? (Marisol Osman)	
12:30-14:00	Lunch	
14:00-15:30	Hands-on session: Correction of systematic errors in subseasonal and seasonal forecast systems (Marisol Osman)	The hands-on session introduces participants to key datasets and tools, providing a practical complement to the morning's theoretical foundations.
15:30-16:00	Coffee Break	

16:00-16:10	Group photo	
16:00-18:00	Icebreaker -- Poster & connect session.	Participants are invited to bring a poster on their research and they will receive feedback from WGSIP members
Tuesday 24 February		
Understanding and measuring predictability		
9:00-9:45	Sources of predictability across timescales: how land contributes to atmospheric predictability at the S2S, seasonal, and multiannual timescales. (Constantin Ardilouze)	This session introduces the land as a source of predictability across timescales and presents new methods to assess predictability, including emerging approaches based on causality and information theory.
9:45-10:30	Identifying Sources of Predictability via Causality and Information Theory (Yuhei Takaya)	
10:30-11:00	Coffee Break	
Predictions across timescales		
11:00-11:45	Cross-timescale Interference: Theory, Mechanisms, and Implications (Laurel Di Sera)	Participants will explore how signals across different timescales interact—either destructively or constructively—and learn strategies for integrating these into coherent forecasts.
11:45-12:30	Bridges of Opportunity to Merge Predictions Across Timescales (Ángel G. Muñoz)	
12:30-14:00	Lunch	
14:00-15:30	Hands-on session (Laurel Di Sera)	Applied exercises related to predictability diagnostics and strategies for merging forecast information from multiple timescales.
15:30-16:00	Coffee Break	
16:00-17:00	Hands-on session: causality (Ángel G. Muñoz); potential extra time for more labs from day 1	
Wednesday 25 February		
Novel methods in climate forecasting		
9:00-9:45	The ML/AI Renaissance: Data-Driven Models for Forecasting (Debbie Hudson)	This session highlights the role of machine learning and AI in modern forecasting systems, including interpretability challenges and the identification of
9:45-10:30	Explainable AI and Forecasts of Opportunity (Kirsten Mayer)	

		high-opportunity events.
10:30-11:00	Coffee Break	
11:00-12:30	Hands-on session: (Kirsten Mayer)	Practical implementation of ML algorithms.
12:30-14:00	Lunch	
Forecast evaluation		
14:00-15:00	Verification of forecasts (Marisol Osman and Ángel G. Muñoz)	This session focuses on tools and metrics to evaluate forecast quality, especially in probabilistic frameworks.
15:00-15:30	Probabilistic predictability assessment (Yuhei Takaya)	
15:30-16:00	Coffee Break	
16:00-17:30	Hands-on session: Teleconnections and processing of multi-model seasonal forecasts (Bill Merryfield) Hands-on session (Cont): verification (Marisol Osman and Ángel G. Muñoz)	Practical implementation of verification tools and probabilistic assessment using real-world forecast data.
Thursday 26 February		
Climate prediction in practice		
9:00-9:40	Coordination for Climate Prediction (WMO/WIPPS) (Yuhei Takaya)	Review of global framework and international initiatives for climate services, and introduces co-production approaches that engage forecast users in the generation of prediction products.
9:40-9:50	Presentation of the WCRP Global South Inclusion Task Team (Anna Sörenson)	
9:50-10:30	Co-production of Climate Information (Leandro Diaz)	
10:30-11:00	Coffee Break	
11:00-12:30	Science communication for climate prediction (Bimo Niraula)	Discusses best practices for communicating forecasts and uncertainty to diverse audiences, from policymakers to the general public
12:30-14:00	Lunch	
14:00-15:30	Hands-on session (Leandro Diaz and Bimo Niraula)	Participants engage in exercises focused on designing communication

		strategies and co-developing forecast products with end users.
15:30-16:00	Coffee Break	
16:00-17:00	Project preparation	Time to finalise presentation for Friday
Friday 27 February		
9:00-10:30	Participants' presentations	
10:30-11:00	Coffee Break	
11:00-12:30	Participants' presentations Closing remarks	
12:30-14:00	Lunch	