Meghívó

Az ELTE Földtudományi Doktori Iskola, a Környezettudományi Doktori Iskola, az ELTE Meteorológiai Tanszék, és az MTA MTB Légkördinamikai és Szinoptikus Meteorológiai Albizottsága

tisztelettel meghívja

Tóth Zoltán,

Global Systems Division, Earth System Research Laboratory, Oceanic and Atmospheric Research

National Oceanic and Atmospheric Administration (GSD/ESRL/OAR/NOAA)

rövid doktori kurzusára amit az előrejelelhetőség témaköréről tart.

Az előadássorozat ideje: 2018. április 24–25.

Az előadások helye:

OMSZ I. emelet, tanácsterem (Budapest II. kerület, Kitaibel Pál utca 1.)
április 24. (kedd délután: 13 00 – 14 30 és 15 00 –16 30)

ELTE TTK, Budapest XI. kerület, Pázmány Péter sétány 1/A. (7.15 terem)
április 25. (szerda délelőtt: 9 30 – 11 00 és 11 30 – 13 00)

A témakört bemutató első, általános előadás (amely szélesebb érdeklődésre tarthat számot) magyar nyelvű, a következő három pedig angol nyelvű.

Lehetőség van a kurzus doktori képzésben történő elismertetésére a (FÖL/KVE Idegen nyelvű szakmai kurzus külföldi vendégelőadóval), melynek feltétele az előadó által kiadott feladat (házi dolgozat készítése angol nyelven) elfogadása június végéig. A tárgyfelvétellel kapcsolatban április 20-ig keressék meg Weidinger Tamást (weidi@caesar.elte.hu).

Minden érdeklődőt tisztelettel várunk!

Weidinger Tamás, elnök Szintai Balázs, titkár
MTA MTB Légkördinamikai
és Szinoptikus Meteorológiai Albizottság

Mészáros Róbert, tanszékvezető
ELTE Meteorológiai Tanszék

Első nap, 2018. április 24. 13 00 – 16 30, OMSZ

1) Ensemble Forecasting Basics

(***Az Ensemble előrejelzés alapjai*** – magyar nyelven, rövid szakmai áttekintéssel a *Global Systems Division, NOAA/OAR/ESRL* kutatási tevékenységéről és aktuális fejlesztéseiről)

Realistic Numerical Weather Prediction (NWP) models can well simulate the spatiotemporal variability of weather. Hence with initial conditions closely representing nature, NWP models are widely used to predict the future evolution of weather. Predictability, however is limited due to the chaotic amplification of forecast errors. The loss of predictability in NWP forecasts is tied to the spatiotemporal scales of weather phenomena: larger scale features are predictable over progressively longer time periods.

In the late 1950s and 1960s, ensemble forecasting, where a set of NWP integrations are carried out from intentionally degraded initial conditions, was proposed to identify, on a case by case basis the predictable signal in NWP forecasts. Obviously, the best single forecast is made starting from the best estimate of the state of the natural system (i.e., form the unperturbed "control" analysis). The larger scale, predictable features in such a forecast carry useful information about nature, while the phase and amplitude of finer scale features soon lose their connection with the evolution of such features in nature.

Through theoretical considerations and experimental data, this presentation will revisit the basic premise of ensemble forecasting. Does the mean of an ensemble, for example, enhance the information on predictable forecast features, or only filters out the unpredictable, smaller scale phenomena while leaving the predictable information unchanged or possibly slightly degraded? Since ensemble forecasting is a computationally expensive operation, the answer to this question can have profound implications as to the optimal configuration for NWP forecasting.

Main scientific questions

- *Variations in forecast skill* – Across space, seasons, weather regimes
- *Forecasting in a chaotic environment* – Beyond the first moment – how to assess predictability?
- *Statistical methods* – Statistical forecast vs. statistically corrected dynamical forecast
- *Theory* - Direct probabilistic NWP forecasting – the Liouville Equations
- *Early attempts* - Stochastic-dynamic approaches
- *Ensemble forecasting* – Revolution in NWP. Assessing and sampling initial value related uncertainties – multiple data assimilation systems, SVs, BVs, Ensemble Transform (ET). Assessing and sampling model related forecast uncertainties

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április 24. (kedd) 13 00 – 14 30.

2.) Sources, Types, and Quantification of Analysis and Forecast Error

- *Observations and numerical forecasts as sources of random and growing errors, respectively*
- *Spatiotemporal coherence of weather features*
- *Partition of forecast error variance into position and structural components*
- *Diagnosis of true analysis error variance from perceived forecast error variance*
- *Partition of analysis error variance into growing and decaying components*

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április 24. (kedd) 15 00 – 16 30.

Második nap, 2018. április 25. 9 30 – 13 00, ELTE

Short overview of the first day presentations

3.) Evaluation of Weather Forecasts

- *Scientific and user assessment* – General vs. specific evaluation
- *Basic attributes of forecast systems* – Statistical reliability ("calibration") and resolution ("skill")
- *Measures of reliability and resolution* – Brier Skill Score, (Continuous) Ranked Probability Skill Score (CRPSS), Relative Operating Characteristics (ROC), Economic Value
- *Metrics of ensemble performance* – Perturbation - Error Correlation Analysis (PECA), Temporal consistency, Higher moment statistics (joint probabilities, correlations, covariances), Potential Economic Value (PEV)

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4.) Decision Making under Uncertain Conditions

- *Instinctive, intuitive, and scientific decision making*
- *Life / everyday experience in an uncertain world* -– Evolutionary & social science perspectives through experiments with rats and undergraduate students
- *Form of forecasts* – Traditional single value / scenario vs. "probabilistic"
- *Calibrated forecasts* – In the presence of forecast errors, must have probabilistic form
- *Weather services slow with adoption of probabilistic framework* – Who is or isn't ready? Managers, forecasters, professional users, general public?
- *Real-world use – Where the rubber meets the road* – Lay and professional decision making when most things are uncertain - Everyone is involved!
- *Decision making algorithms* – Weather is but one aspect of users' life / operations – What weather information can be used and how – Integration into professional decision making algorithms; From simple cost – loss models to complex decision matrices
- *"To tell the truth, the whole truth"* – Moral commitment to convey full / all forecast information – Withholding information is unscientific and unethical - Particular form of forecast should depend on user context

Conclusions

ELTE TTK, Pázmány Péter sétány 1/A., 7. emelet 7.15, április 25. (szerda) 11 30 – 13 00.

Course Expectations

Format

– 60-75 mins presentations, 15-30 mins questions /discussion
–Please stop me with questions!

Absorb new knowledge, understand concepts, discourse on subject

–No time for quantitative studies – solid conceptual understanding

Formal evaluation requirements

– 3-page min. essay paper in English by June 30
On self-chosen predictability subject addressing topics from at least two lectures
Contains critical discussion of one (or more) selected journal article(s)
Reflects understanding of concepts discussed

– Active Participation in seminars
Questions asked
Comments made

Language

–1. seminar will be in Hungarian
– 2-4 seminars will be in English

–This is not a language course so you can speak in Hungarian

Hope to learn from your questions and comments