Recommendations of the 2005 Workshop on Assimilation of Satellite Cloud and Precipitation Observations in NWP Models

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ECMWF-JCSDA Workshop on Assimilating Satellite Observations of Clouds and Precipitation into NWP Models
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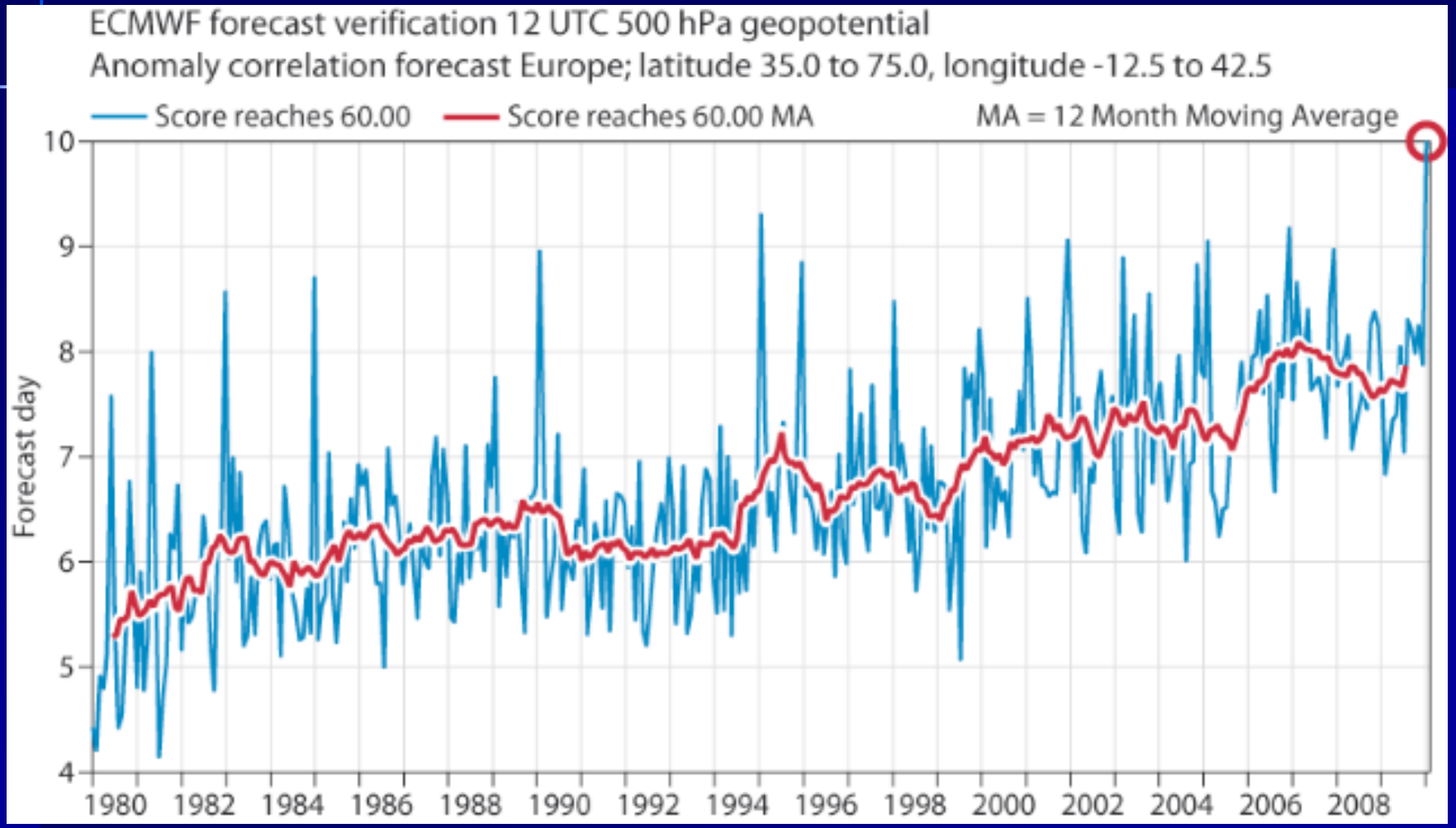
Skill of Weather Predictions



Satellite Observations in NWP

- Over 1.4 billion observations received
- Only 0.5 % used
  - Clouds (50 % of Earth)
  - Surface emissivity
  - Thinning
  - Errors

Motivation for Assimilating Cloud and Precipitation Observations

- Better
  - Weather forecasts
  - Climate trends
  - Climate models

2005 Cloud-Precip Workshop

- Goal: accelerate progress in assimilating cloudy observations
- May 2-4, 2005; 45 international scientists
- Observations, modeling, assimilation
- Overviews, short talks, breakouts
- Output: Current capabilities, impediments to progress, recommendations

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SPECIAL SECTION: Assimilation of Satellite Cloud and Precipitation Observations in Numerical Weather Prediction Models

Observations
Recommendations to accelerate progress

- Use ARM site and field campaign observations to validate satellite clouds/precip
- Design validation programs with data assimilation in mind
- Exploit mm wave sounding channels (AMSU-B, SSMIS)
- Organize communication among and within the modeling, assimilation, and observation (remote sensing and in situ) communities regarding current problems and possible solutions; e.g., workshops on cloud **and** precipitation observation and modeling—leverage existing meetings whenever possible

Modeling Clouds and Precipitation
Recommendations to accelerate progress

- Construct high-quality, independent cloud and precipitation verification data sets
- Validate process models with cloud resolving model data sets
- Develop moist convective schemes compatible with data assimilation
- Simplify and linearize physics schemes

Radiative Transfer

Recommendations to accelerate progress

- Construct a high-quality data set of satellite observations and in-situ information of cloud condensates to fully assess RT model performance
- Characterize biases and standard deviations of simulated radiances
- Determine mean particle sizes from VIS/IR /microwave obs
- Develop fast, accurate RT model for clouds and precipitation

Assimilating Cloud and Precipitation Observations
Recommendations to Accelerate Progress

- Compare model simulated with observed cloud/precipitation radiances
- Entrain model developers in designing physical parameterization schemes for data assimilation applications
- Encourage data and model providers to provide error characteristics
- Implement precip/cloud assimilation schemes even if impact is initially neutral
- Develop new forecast skill measures for cloud/precip and their effects on other fields
- Determine expected increase in cloud/precip forecast skill from predictability experiments

Overarching Recommendation

- Cloud and precipitation assimilation requires combined effort of the observation, modelling and data assimilation communities