Austria

- AROME-RUC for Nowcasting
- Assimilation of RADAR and MODE-S data
- AROME-EPS on demand

Belgium

- Perturbation - updraught parameterization for ALARO-1

- CORDEX participation

Croatia

- Operational suite uses LBC files from ECMWF, 8 km resolution uses Alaro0 with 3Dvar and Canari in 4 runs per day up to 72 hours, 4 km run uses Alaro0 with Canari once per day up to 72 hours on 73 levels.
- Testing and development: new clim files for all domains (including new ones in 250m resolution) created from the new database (including surface fields for ISBA computed from SURFEX fields), 3Dvar suite for 4 km run, an alternative to MCUF was sought that would compute the error in surface pressure that arises due to 3 hourly coupling for IFS coupling files.
- Using statistical techniques for operational post-processing of forecasts to suite the needs of forecasting power production from the wind farms and energy efficiency in buildings.

Czech Republic

- Summary of changes in the operational status
- Recent research activities

Highlights of NWP@DMI, 2015

- Preparation for new operational setup with extended domains and multi-model meso-scale EPS on the new HPC in early 2016, in collaboration with IMO.
- Activities for improved HARMONIE forecast on fog and low clouds.
- Research on radar data assimilation with use of radar reflectivity data from Denmark and 9 surrounding neighbouring countries

France

- ARPEGE-ALADIN-AROME operational and experimental suites
- PEARP: MF short-range Ensemble Prediction System
- Future AROME overseas
- AROME-France Ensemble Prediction System

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

Evolution of numerical weather prediction at Deutscher Wetterdienst 2015 - 2017

Michael Baldauf

Deutscher Wetterdienst (DWD), Offenbach

Schedule of upgrades of operational NWP system at DWD

- **January 2015:** ICON with 13 km grid spacing and 90 layers
- **July 2015:** ICON nest (2-way interaction) over Europe with 6.5 km grid spacing and 60 layers
- **January 2016:** Hybrid ensemble data / 3D-Var assimilation for ICON
- **Q2 / Q3 2016:** LETKF data assimilation for COSMO-D2 with 2.2 km grid spacing and 65 layers; extended domain
- **Q1 2017:** ICON-EPS with 40 km (20 km over Europe) grid spacing and 90 layers; 40 members

HELLENIC NATIONAL METEOROLOGICAL SERVICE
ΕΘΝΙΚΗ ΜΕΤΕΩΡΟΛΟΓΙΚΗ ΥΠΗΡΕΣΙΑ

CONSORTIUM FOR SMALL SCALE MODELING COSMO

HNMS: NWP activities/plans

Efforts are paid to maintain current NWP related infrastructure despite financial constraints and improve the quality of forecasts obtained by existing NWP systems. Main directions:

- Port and run operationally COSMO at the recently formed Greek hypercomputer institute GrNet (on an IBM xeon-based system). -.
- Models setup: Expand COSMO-GR 2km domain to a largest extend within the given resources and/or increase daily runs (currently two).
- End Users: Use high resolution COSMO wind with SWAN wave model to produce detailed coastal forecasts (in addition to existing sea state forecasts). Reach operational use status for COSMO-ART (currently being setup in cooperation with NOA) focused on dust forecasts

Hungary

- Operational suite (ALADIN, AROME, LAMEPS)
- Data Assimilation developments
  - HRW AMV in AROME
  - LAI and soil moisture assimilation → ImagineS project
- Physical parameterization developments
  - Turbulence in the grey zone
  - SLHD tuning in AROME

Italy

- The NWP system at the Italian Air Force Operational Met Center (COMET):
  - The operational LETKF data assimilation system
  - The short-range ensemble prediction system : COSMO-ME EPS and NETTUNO-EPS
  - Future developments

National activities poster: MOROCCO

Hassan HADDOUCH

- **Operational NWP suites:**

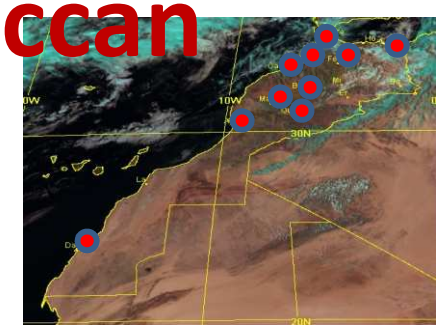
✓ ALADIN-NORAF, ALADIN-MAROC, AROME-MAROC

- **Preoperational NWP suites**

✓ Cycle: cy 40op2 , 70 vertical levels ALADIN-NORAF and ALADIN-MAROC

✓ 90 vertical levels: AROME-MAROC

- **Processing and assimilating of ground based GPS data from the Moroccan network in ALADIN/MAROC**



Norway

- AROME-MetCoOp EPS
- AROME-Arctic
- beta.yr.no

Poland – ALADIN

- ALADIN CY40T1bf5 now operational in Poland
- new operational suites:
  - ALARO - 4.0 km resolution,
  - AROME – 2.5km resolution (soon 1.7km)
- new applications of ALADIN at IMGW

Poland – COSMO

- Current Operational Systems: Status of COSMO-PL and pre-operational convective-scale ensemble.
- Research & Developments: Recent results of Priority Project COSMO-EULAG operationalization and results of soil state perturbations as an input for EPS forecasts.
- Verification: Application of spatial methods to COSMO-PL.

Portugal

- New operational (regional) NWP system and its most recent upgrades
- Historical erification (ECMWF, ALADIN, AROME)
- Example of downstream application of NWP products

Romania – ALADIN

- ALARO operational suite
- Statistical approach in order to estimate wind shear profile and preliminary results comparing PBL LIDAR data with ALARO0 and ALARO1 forecasts
- A case study from 27. September 2015 and a new graphical package developed within RC-LACE and NMA

Romania – COSMO

- operational activities for COSMO Romanian group
- research activities for COSMO Romanian group
- direct model output verification

Russia

- **Operational *4 times per day* COSMO-Ru for 7 area:**

  Moscow:

  – COSMO-Ru7 (7x7 km, for part of Europe), 78 h;
  – COSMO-Ru2 (2.2x2.2 km, for area of Central region), 24 h;
  – COSMO-Ru2 (2.2x2.2 km, for area of Sochi-2014), 42 h;
  – COSMO-Ru2 (2.2x2.2 km, for area of Kazan-2013), 42 h;
  – COSMO-Ru1 (1.2 x 1.2 km, Sochi-2014), 36 h,
  – COSMO-Ru-ENA (13.2 x 13.2 km, Europe + North Asia), 120 h;

  Novosibirsk:

  – COSMO-Ru-Sib-13 (**new -** 13.2x13.2 km, Siberian region),78 h
- **New 2015:** High resolution Raid Refresh (HRRR), 1.2 x 1.2 km;
  – **Khabarovsk (end of 2015):**
    - COSMO-Ru-FE-13 (13.2x13.2 km, Russian Far East),78 h
- **Main efforts:** project SWFDP WMO for four countries of Central Asia.
- **Pollution transport:** COSMO-Ru7-ART runs every day in quasi-operational mode 48-hours forecast of air pollutant's concentration over center of the European part of Russia.

Serbia

- Description of the models in short range forecast
- Operational use of NMMB NWP model - global, regional, nested
- Applications of NWP products

SHMU/Slovakia

- ALADIN model: 9km/37levels operational, 4.5km/63levels in e-suite, ALARO-0 physics, Blending+CANARIsurface
- major upgrade of SHMU infrastructure (HPC, radars, AWS) to be completed this autumn
- results of R&D work

Slovenia

- Developments in data assimilation:
  - study of the use and impact of Mode-S aircraft observations
  - an experimental assimilation of LandSAF snow cover
- 2 way coupling of ALADIN model and ocean model (first results)

Spain

- HARMONIE/AROME 2.5 km deterministic forecast is run operationally and it is an important part of the AEMET prediction system. Currently run as a TC application at ECMWF and this autumn is expected to have it operational in the new Bull AEMET computer.
- Assimilation of new observations in the HARMONIE system: GPS/GNSS data, ATOVS and Radar data produce a positive impact on the forecast.
- Towards a SREPS system at 2.5 km resolution based on a Multi-model and multi-BC approach:
  - SLAF using ECMWF deterministic improves ECMWF EPS
  - Multi-boundaries (ECMWF, GFS, CMC, JMA, ARPEGE) improves ECMWF SLAF
  - Multi-model (AROME, ALARO, WRF-ARW, WRF-NMM) approach gives good results

Sweden

- Progress with assimilation of Radar and IASI data
- Stochastic parametrisation of cumulus convection tested in meso-scale EPS
- UUI spread-skill relationship shows an overdispersion for GLAMEPS

Switzerland

- Current operational NWP suites at MeteoSwiss
- COSMO-1: study of the improvement of valley winds
- GridTools: A Tool for Stencil Methods on Grids

United Kingdom

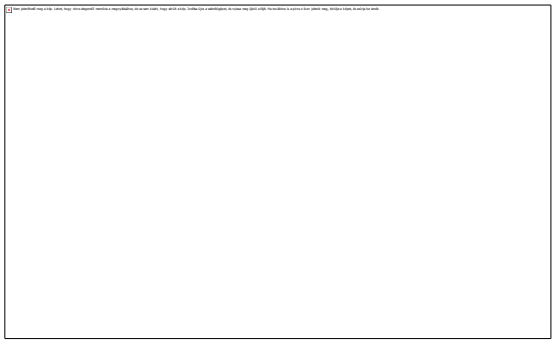
- The Met Office has developed a 333m model over London and its performance relative to the 1.5 km parent model will be evaluated for cases of fog at Heathrow.
- Differences in how the cloud cover parametrization is set up in the two models, rather than resolution, can explain most of the difference in behaviour.
- However, the increased resolution can be of benefit when combined with a representation of how the more detailed topography contributes to generating low-level turbulence.

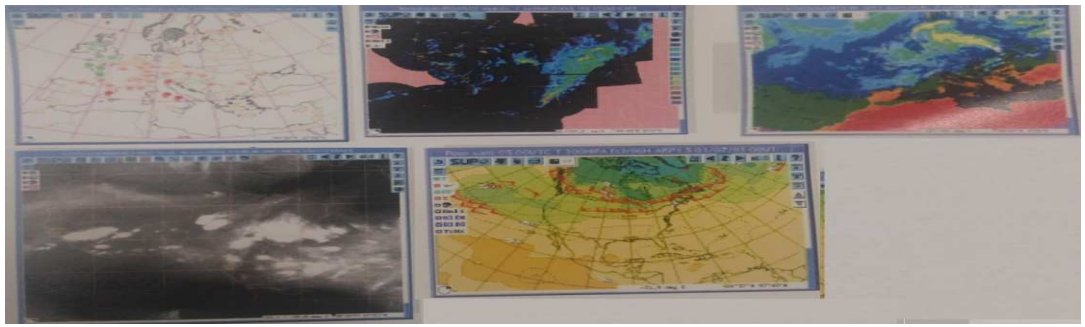
Ukraine

- Coupled systems which are developed on NWP models
- Forecast of thunderstorm and some information about related aspects
- Research activities

LEBANON– Numerical Weather Prediction (NWP)_State Of The Art

- **Commonly Weather Forecasting Modeled (WFM)Used In Lebanon is ARPEGE (70 km high, Horizontally10km resolution over Paris widens as it extends away from the French capital reaching a size of 60 km over its antipode.)**





- **Unfortunately, in some cases, the obtained predictions are misleading, as observed by practitioners and meteorological engineers and forecasters.**

- **This weaknesses highlight the need to collect climate data stream in order to get a better assessment of a WFM, this brings The Meteorological Services Of Lebanon to a point where a new Local accurate, reliable, and efficient forecasting model becomes inevitable with all it's stages from climate data stream collecting and processing it, to filtering and integrating the data, all through analyzing it.**