2021 EWGLAM ET-DA DA sessions

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Progress with the algorithms

- Better definition of the uncertainties
  - Well tuned/computed background error statistics is essential (3D-Var & LETKF)
- Accounting for large scale information
  - (classical) J_k and pre-mixed penalty-free J_k
  - Large scale blending (applied only when fresh LBCs are available)
- Boundary conditions
  - SST (hourly update)
- Initialisation
  - LHN -- latent heat nudging
  - 4D-IAU (4DEnVar)
- Cycling strategy
  - Hydrometeor + J_k
  - 1h / 2h / 3h RUC ("dry" and "wet" parameters differently handled/predicted)

Progress with the algorithms

- Assimilation schemes and solutions
  - 3D-Var
  - 4D-Var
  - LETKF (KENDA)
  - (3D/4D) (hybrid) EnVar   (4DEnVar > 3DEnVar > 3D-Var)
  - Particle filter
- Assimilation framework
  - OOPS
- Perturbation techniques
  - AMPT
- Nowcasting techniques
  - Optical flow (rainymotion)

Progress with the use of observations

- Handling in appropriate scale
  - Supermodding / footprint operator
  - Superobbing
- Closing temporal and spatial gaps
  - Use of more satellite instruments
  - Use of low peaking satellite channels
  - Use of mid-tropospheric AMV
  - Assimilation in all-sky condition [MW,Seviri (VIS, WV, reflectance)]
  - GNSS-SPD
  - Use of METAR (increase 50%)
- Bias correction
  - Cycling strategy for VarBC in LAM radiance assimilation
- Mode-S (EMADDC) (continuous processing in real for nowcasting)
- Radar reflectivity + LHN + *2 moment microphysics*

Progress with the use of observations

- Radar Doppler wind (using dealiassing)
- Scatterometer
- GNSS-RO
- Personal weather stations
  - Netatmo (T2m, Hu2m, Ps)
  - WOW (T2m, Precip)
  - Smartphones (Ps)
- T2m and H2m: good impact without bias correction
- Importance of quality control
  - WOW (T & precipitation)
  - TITAN QC for personal weather station data, also for moving smartphones

Thanks a lot Bruce Macpherson !!!