User Voice Corner

UEF feedback session

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ECMWF

Structure of the Feedback Session

User Voice Corner

UK time

- 15:30 Summary of Responses to the Online Feedback Survey (9 questions)

- 16:00 Hybrid Breakout Groups (set of 3)

- 17:05 Return for Optional Seminar

- **Breakout Group Summary** bullet points will be posted online in due course, in the Forecast_User portal:
  - Will primarily cover new requests and any unanswered questions
  - check/"watch" the forecast user blog for notification - https://confluence.ecmwf.int/pages/viewrecentblogposts.action?key=FCST)

Hybrid Breakout Groups - 16:00 UK time

A chance to quiz ECMWF experts directly, or deliver requests, feedback etc…

Meeting Room 1: 1. Technical topics (e.g. data, ecCharts, Open Charts, 48r1 changes, new HPC, MARS move)

(Cihan Sahin, Sylvie Lamy-Thepaut (*remote*), Daniel Varela Santoalla, Emma Pidduck, Jenny Rourke, +…)

Meeting Room 2: 2. Extended Range and Seasonal

(Tim Stockdale, Frederic Vitart, Fernando Prates (*remote*), Anca Brookshaw (*remote*), +…)

Weather Room: 3. Model / Forecast / Product topics

(Linus Magnusson, Ervin Zsoter, Richard Forbes, Ivan Tsonevsky (*remote*), +…)

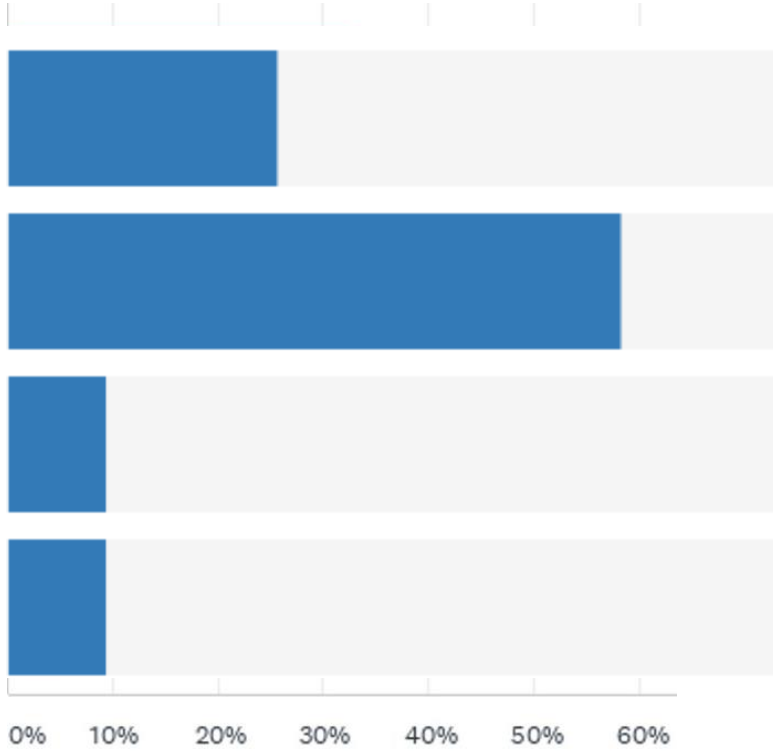
Please "drop by" any of the above that interest you – you can go to more than one!

Survey Results

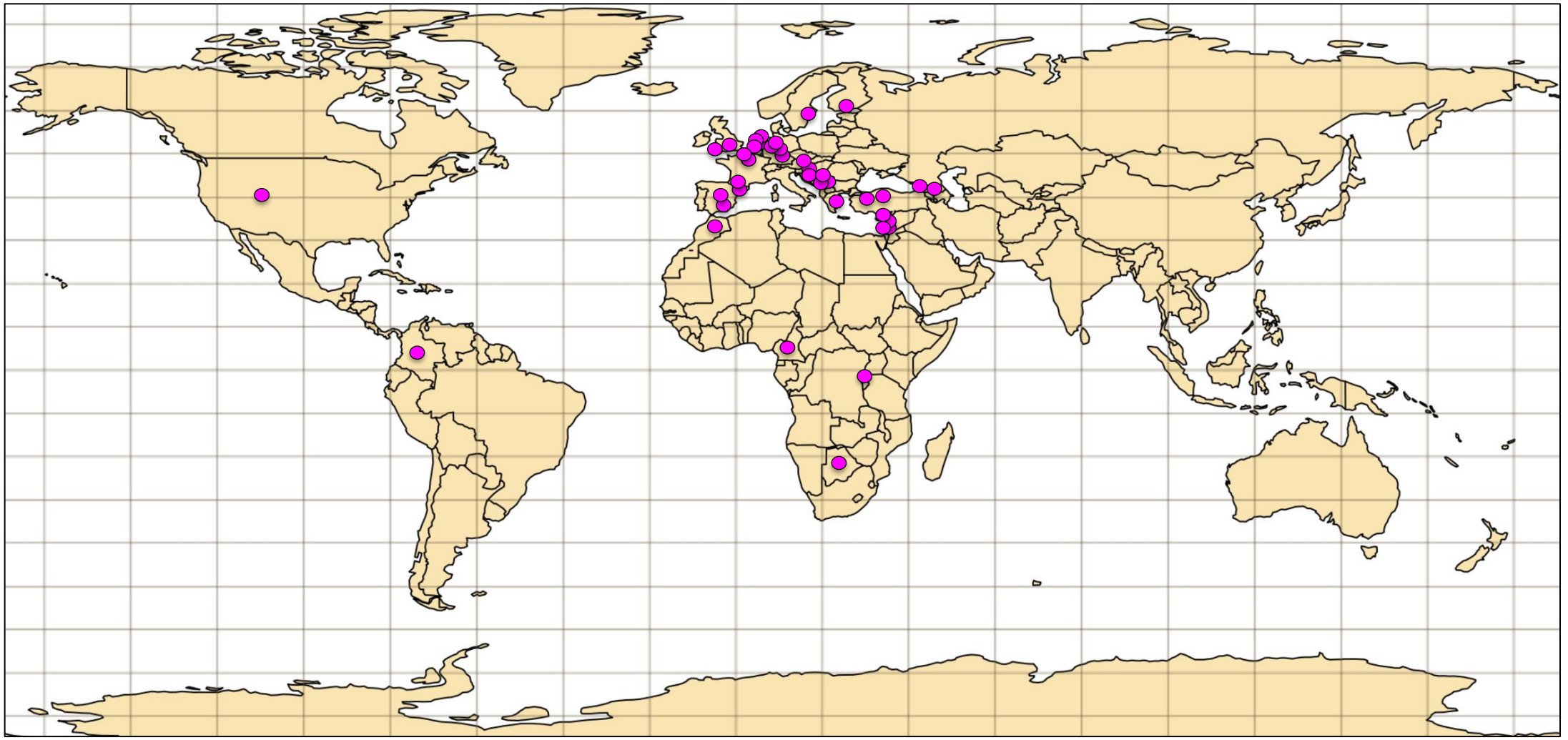
- Will include some illustrative plots provided (mainly) by respondents

Q1: Which of the following categories best describes your employer?

	2020	2021	% 2022
• Private Company:	25	32	**24**
• Public Sector (NMHS):	42	58	**58**
• University:	11	3	**9**
• Other:	11	6	**9**
No. of replies:	56	32	45



Q2: …Name and Affiliation… : Where are survey responders based?



General remarks on your online survey responses:

1. Some users have **requested products, or raised issues**, that **ECMWF has already partly or fully addressed**

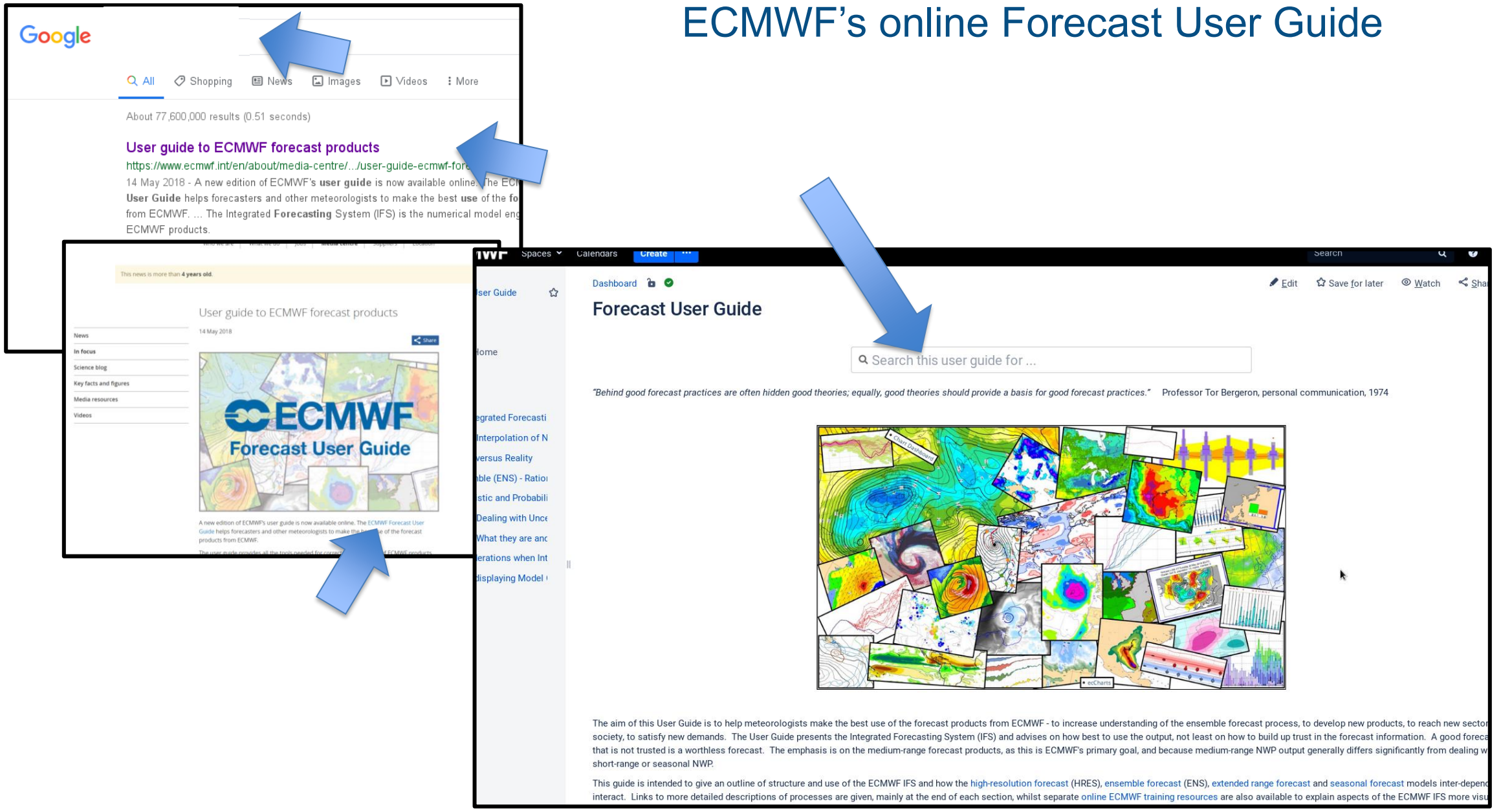
2. Some users highlight **issues that are known about** and that have been documented / discussed on the **known forecast issues page** and/or in the **online ECMWF Forecast User Guide**.

3. Many **topics** will be covered in **breakout groups**

4. Other **related topics** will be covered, on Fri, in the **Speakers Corner**

5. Feel free to contact me, or other ECMWF staff, for **anything else** that needs addressing!

ECMWF's online Forecast User Guide



Q3: What forecasting aspects that relate to ECMWF model outputs are of particular concern to you and your organisation? (1 of 4)

Range / Model

- HRES **7**
- Short Range **9**
- Medium Range (ENS) **16**
- Extended (=Monthly) **12**
- Seasonal **10**
- ERA5
- Ocean

Parameter

- Rainfall/Precipitation **8**
- Temperature **5**
- Geopotential / MSLP
- Low level Winds (10m, 100m, gusts, …) **5**
- Solar Radiation **2**
- Humidity
- Visibility **2**
- Precipitation Type
- Cloud
- NEW Aerosol **2**

Q3: What forecasting aspects that relate to ECMWF model outputs are of particular concern to you and your organisation? (2 of 4)

Hazards

- Extremes / High Impact Weather **5**
- Convection **3**
- Aviation forecasting / Aviation hazards (e.g. turbulence / icing) **6**
- Tropical Cyclones / Tropical Weather **2**
- Hydrological Extremes (including flash floods) **4**
- Polar lows (NEW)
- Wildfires (NEW)

Products

- Meteograms **4**
- EFI **2**
- Tephigrams
- Stratosphere-related (NEW)

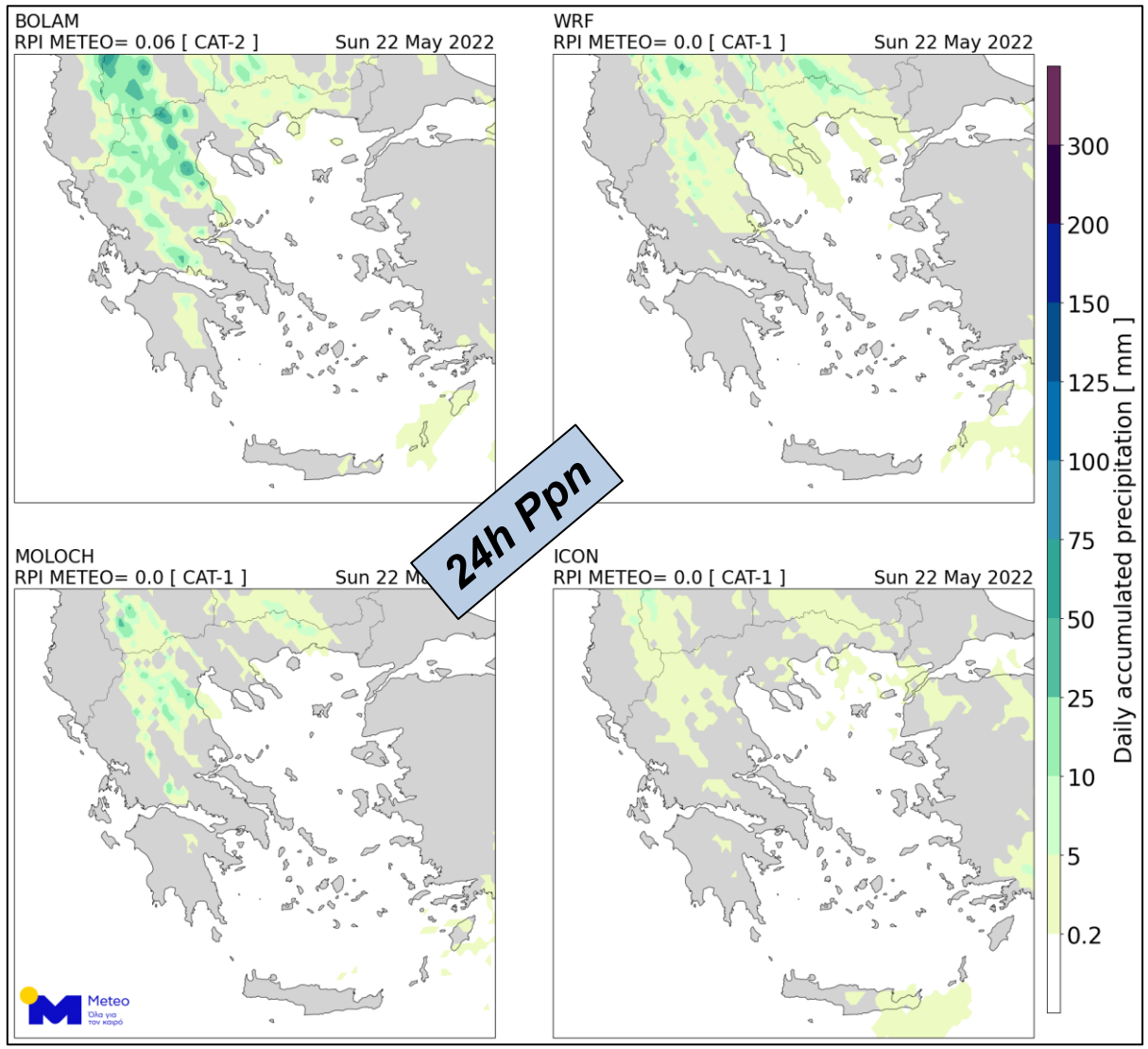
Access

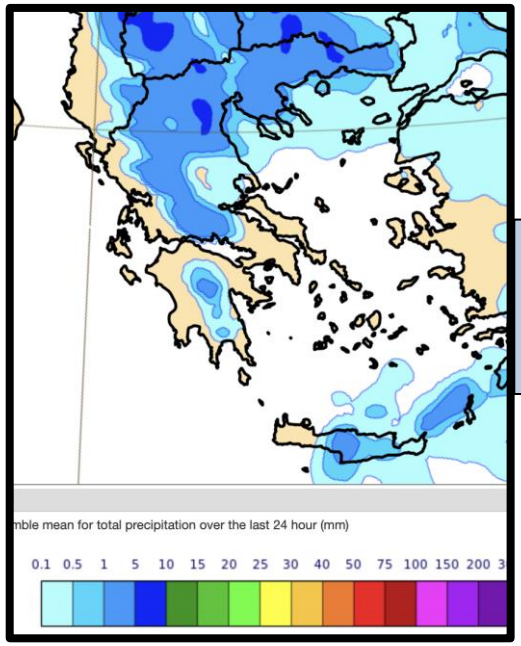
- Timeliness **2**
- Accuracy **4** (NEW)
- Transfer speed **2** (NEW)

Other

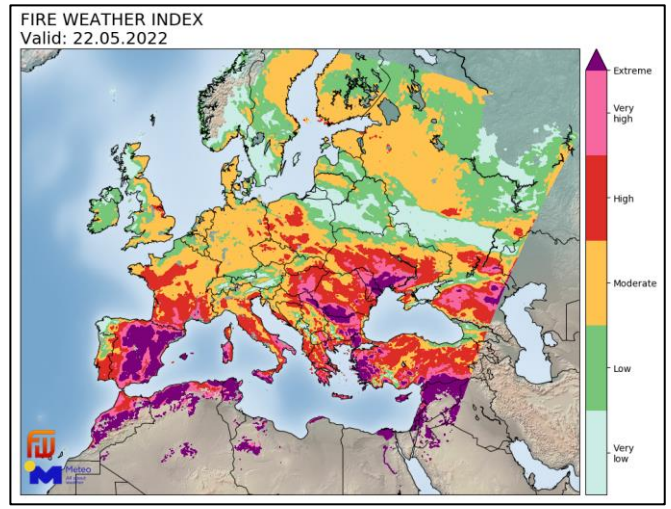
- Model Resolution **2** / Post-Processing **2** / Boundary condition usage **3** (NEW)

Products from University of Athens, initialised with GFS BCs – want to use ECMWF BCs





ECMWF ENS mean (T+0-24)



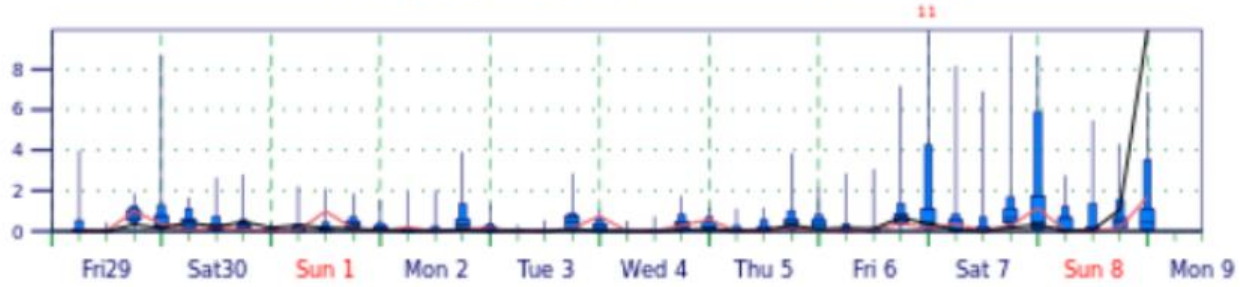
Meteograms

Location: 4.6°N 74.08°W, Bogotá, Colombia

Help More ... Load ...

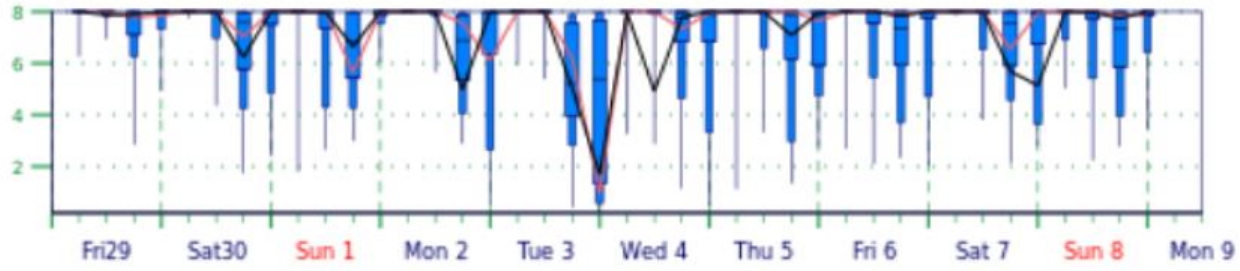
10-day epsgram total precipitation (mm/6h)

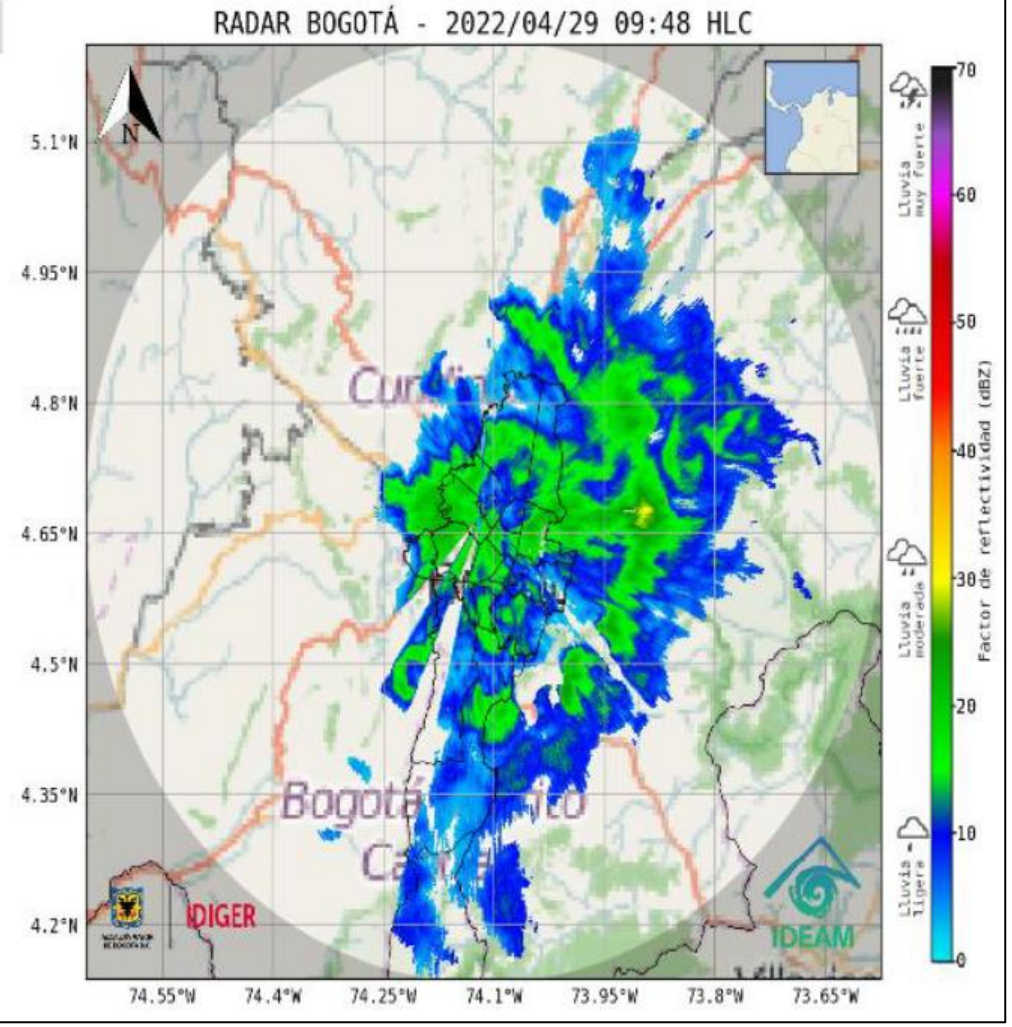
Base date: Friday 29 Apr, 00 UTC, adjusted to 2567m height



10-day epsgram total cloud cover (okta)

Base date: Friday 29 Apr, 00 UTC, adjusted to 2567m height





Q4: Have you experienced any particular problems with ECMWF forecasts in the last 18 months (e.g. systematic errors/biases, one off bad forecasts)? (1 of 2)

- No/no entry: **66%** (39% in 2021)

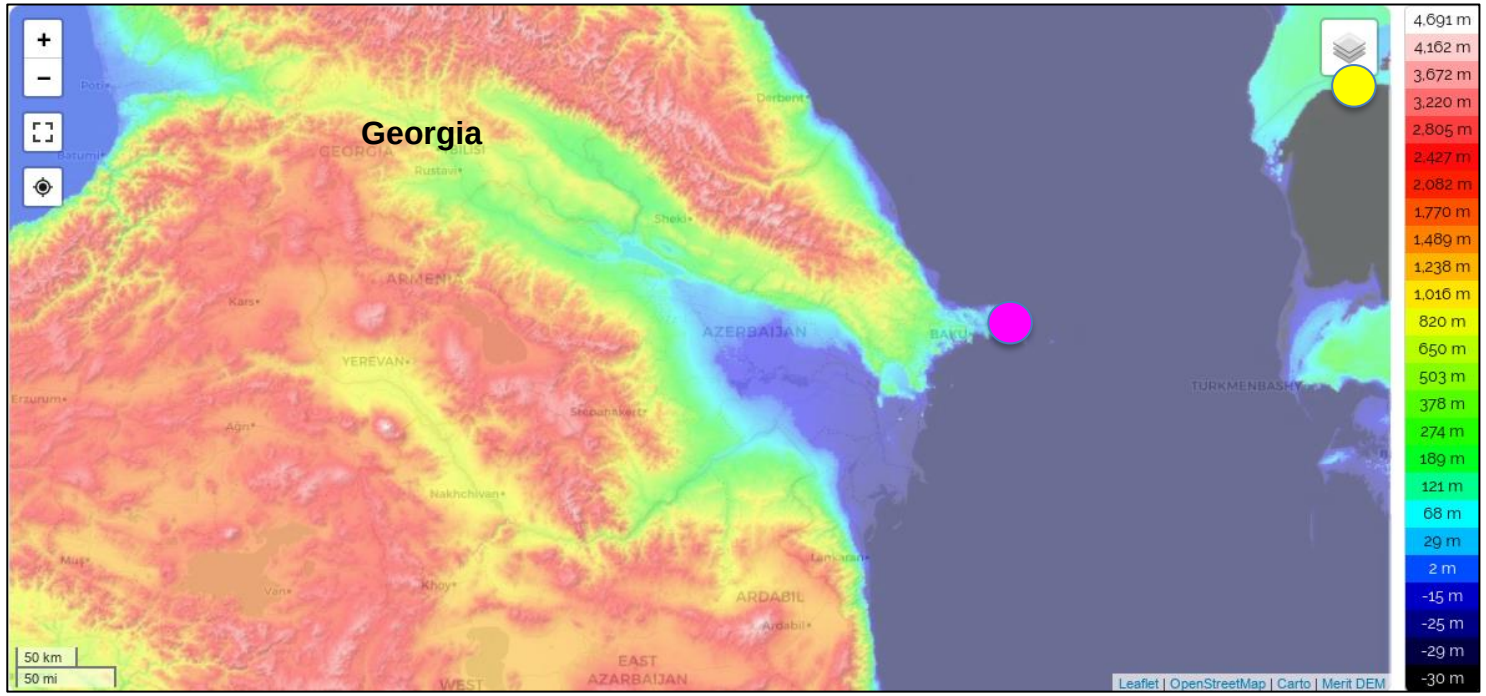
Precipitation
- More rain over sea than land – Israel (known issue of SST-triggered convection not advecting inland)
- T+48 precipitation forecast bust, west Georgia, for 19 Feb 2022 - turned out dry
- Rainfall forecasts for Ghana ordinarily poor – drizzle predicted regularly, no distinction of wet vs dry days (point rainfall may help?)
- Rain-bearing (?) incursions from the east into E Georgia in spring-summer handled poorly (Caspian SST handling difficulties?)
- NW Andes / Columbia precipitation forecasts poor - e.g. typically 2x greater than other global models, but rain events also missed **2**
  ('2x' => manifestation of IFS weather-situation-dependant bias? – bias correction component of point rainfall may shed light on this)

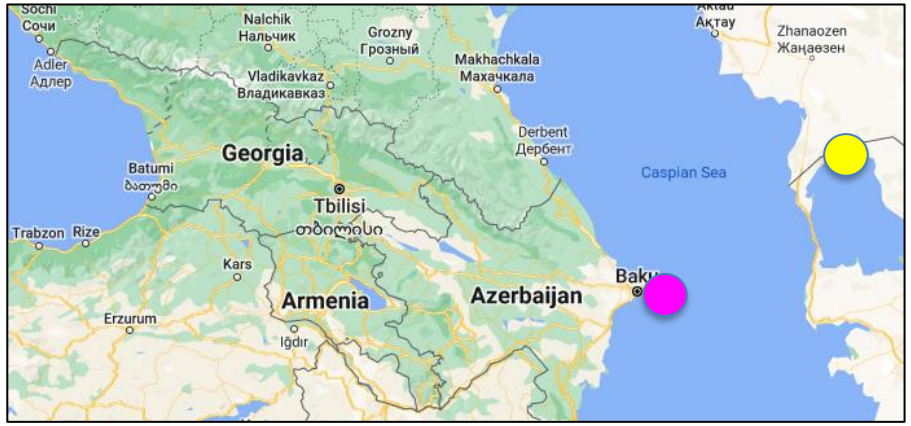
2m Temperature
- Huge cold bias in Finland this spring, on sunny days – IFS consistently 5-10C too cold (snowmelt details?)

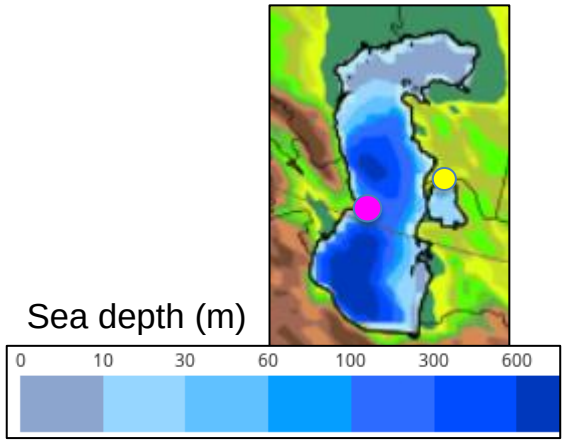
Low level winds
- Usually much too light (Israel)
- 10m gusts too weak (Aurore, Eunice are examples)

Cloud
- Barrage cloud handling biases in Croatia (resolution issue? cloud height definition issue?)

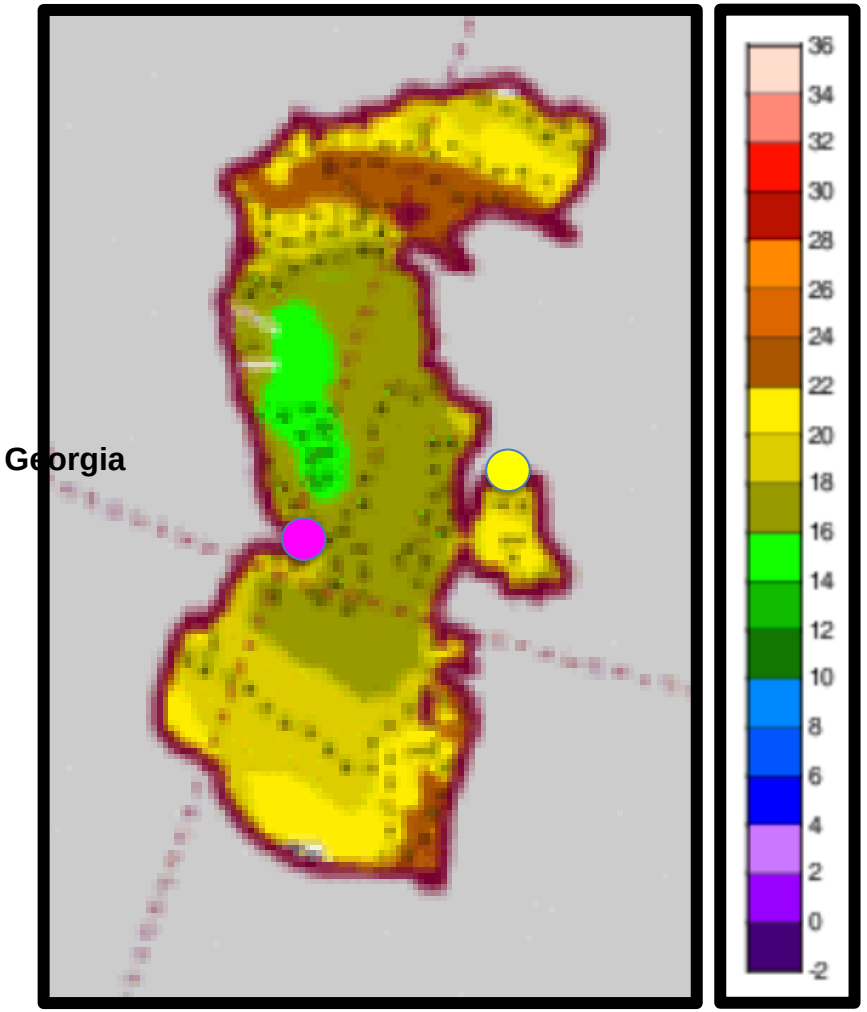
Snow
- Model can generate snowfall with high 2m temperatures (e.g. 10C)







"The HRES finds it difficult to describe invasions from the east on the South Caucasus territory during the spring-summer period" – comment from Georgia

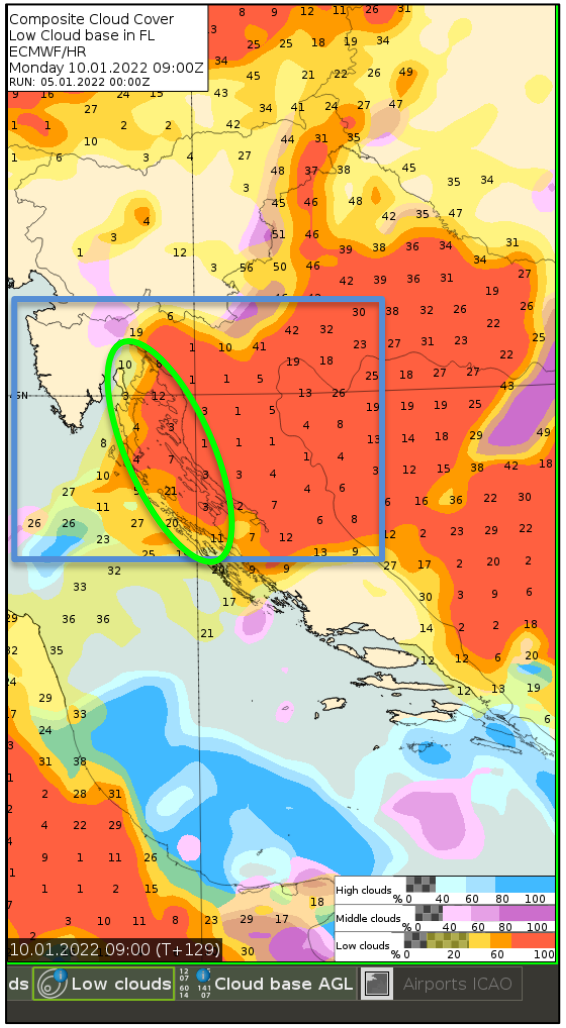


SST analyses, Caspian Sea, 12h intervals from 12UTC 18th - 00UTC 25th May 2022

Low cloud erroneously spills over into Adriatic

From Croatia Control (air traffic)

HRES



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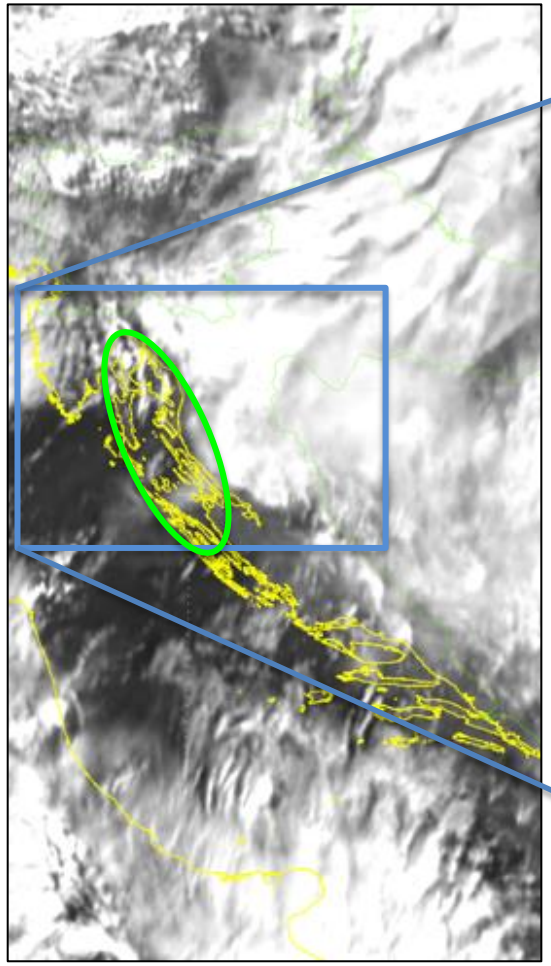
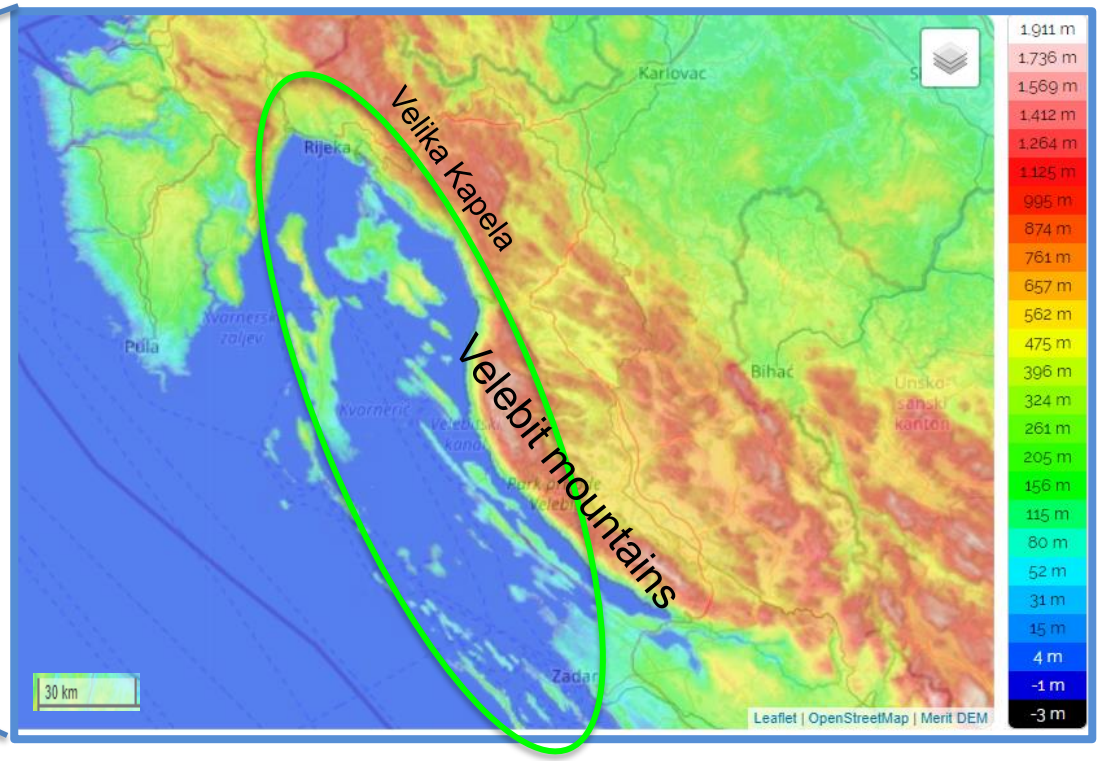


TOPOGRAPHY



- A resolution limitation ?
- Impact of ECMWF's "low cloud" definition (<1800m) ?

Q4: Have you experienced any particular problems with ECMWF forecasts in the last 18 months (e.g. systematic errors/biases, one off bad forecasts)? (2 of 2)

Aerosol

- Can lead to errors in the forecasts (yes, CAMS-IFS model can help diagnosis, Saharan dust incursions into Europe problematic)

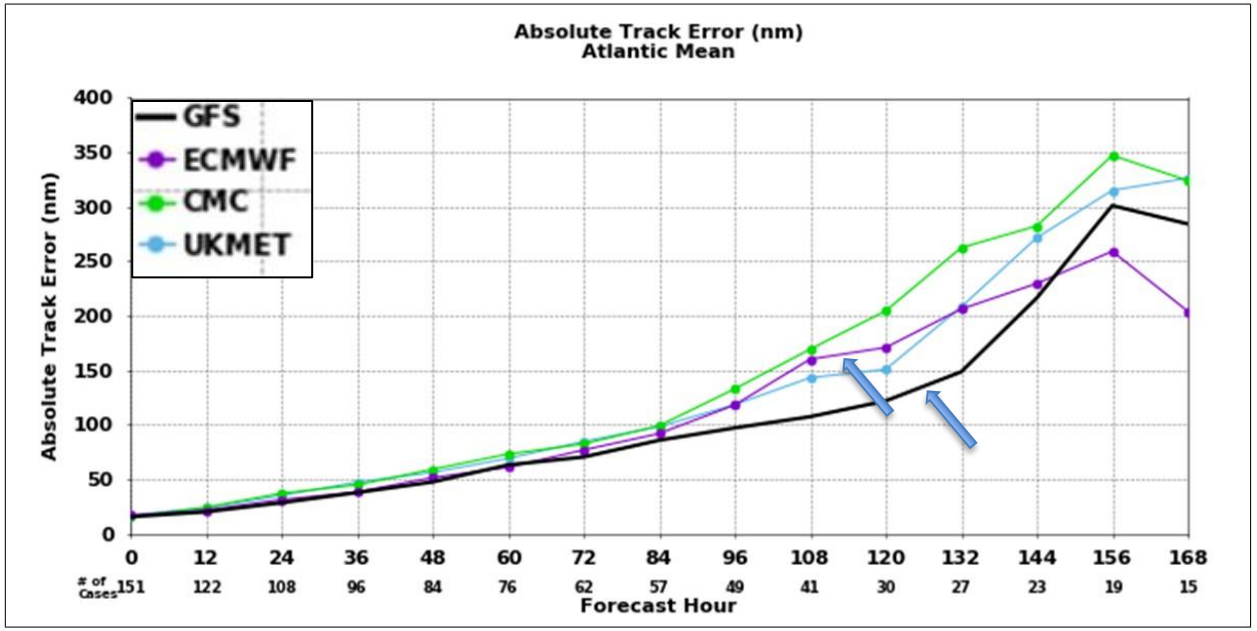
Tropical Cyclones

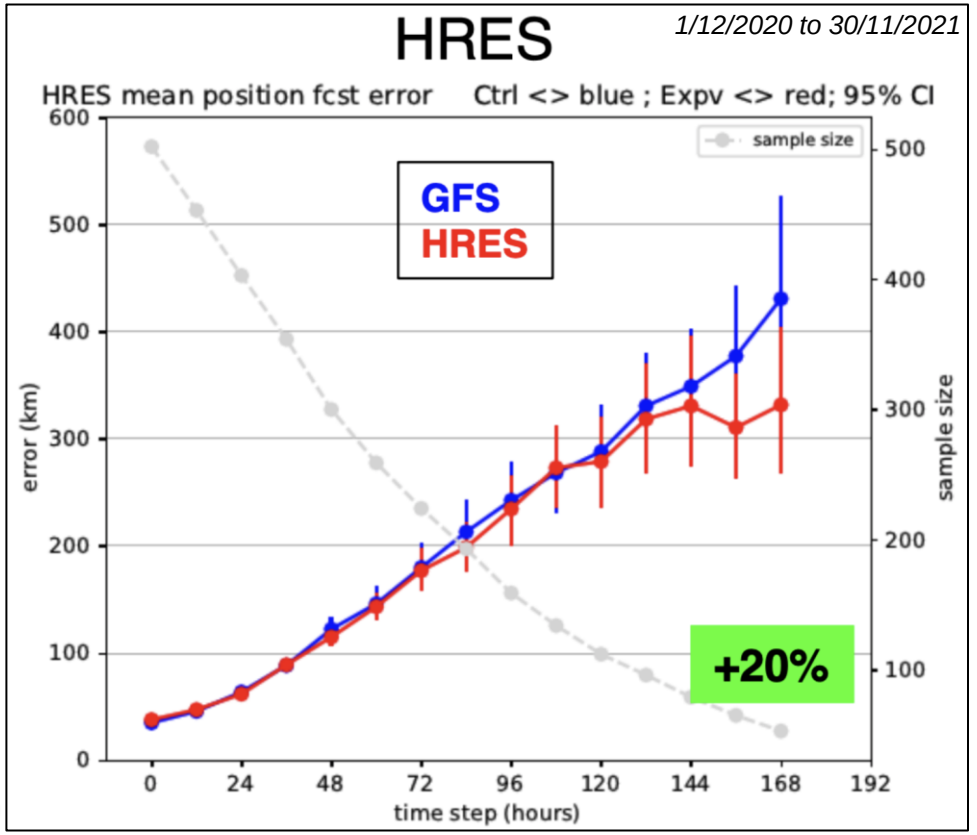
- Concern about poor performance of 2021 IFS TC position forecasts for the Atlantic (sampling issue? Global performance better)

Regimes

- Change of regime at end of Feb 2022 poorly forecast, even at short ranges
- Extended range forecast towards end of 2021 incorrectly heralded cold European weather for early 2022

TC track errors – UK concern about 2021 ECMWF performance for Atlantic Basin





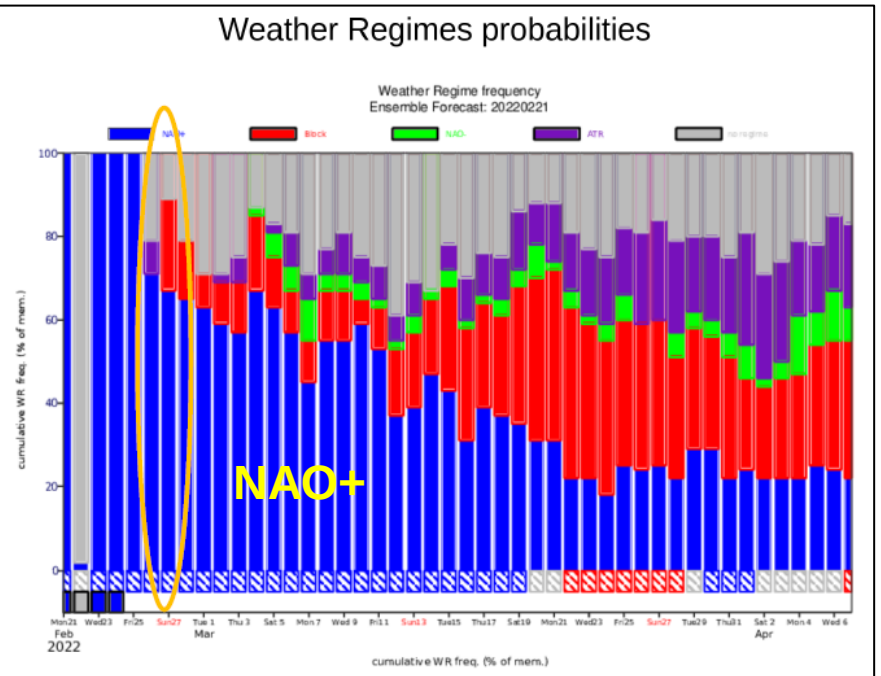
- Met Office plot, shows GFS better at longer leads
- ECMWF-generated plot for the **Atlantic** is similar, but…

- **Globally**, in 2021, we outperformed GFS at longer leads
- Atlantic performance may have been a ‘sampling glitch’

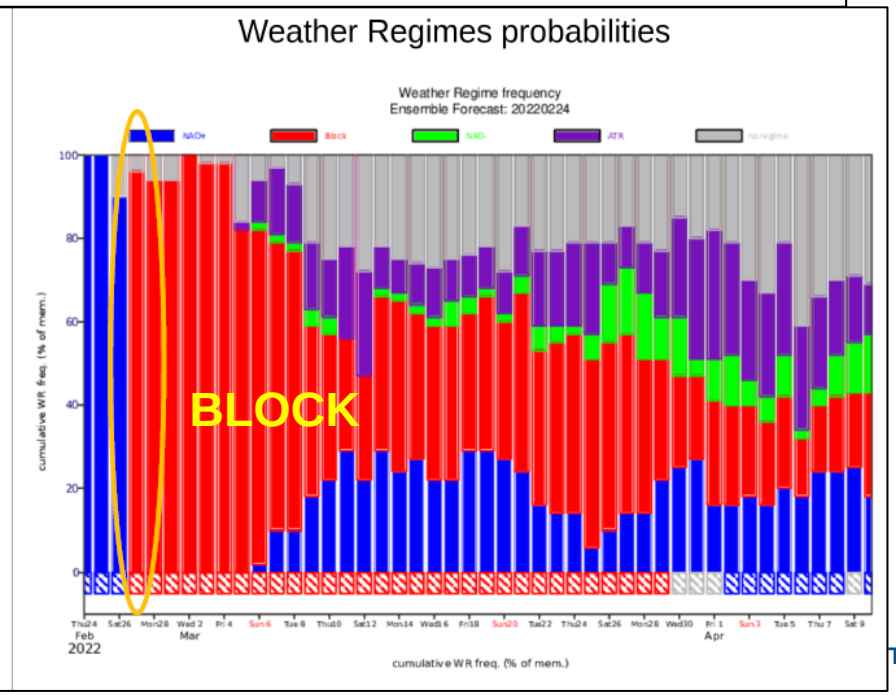
- No complacency however ! – see comprehensive TC Tech Memo 888, by Magnusson et al (138 pages)

Poor regime transition forecast (reported by Croatia's NMHS)

Run 21.02.2022. (-3 days)
NAO+ probability drops,
Block probability appears
• signal of change? +
• very weak signal Block
can persist in the next days

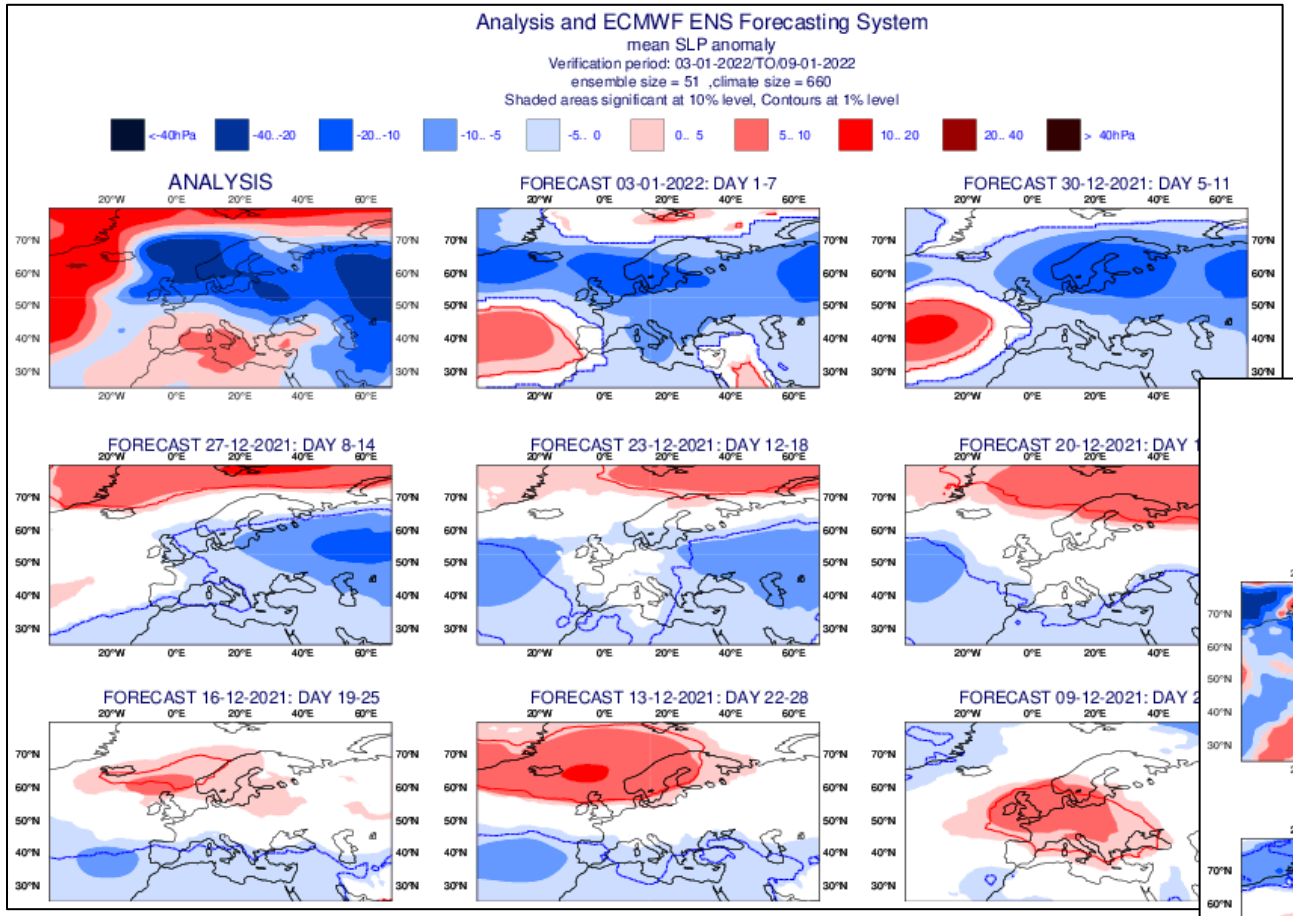


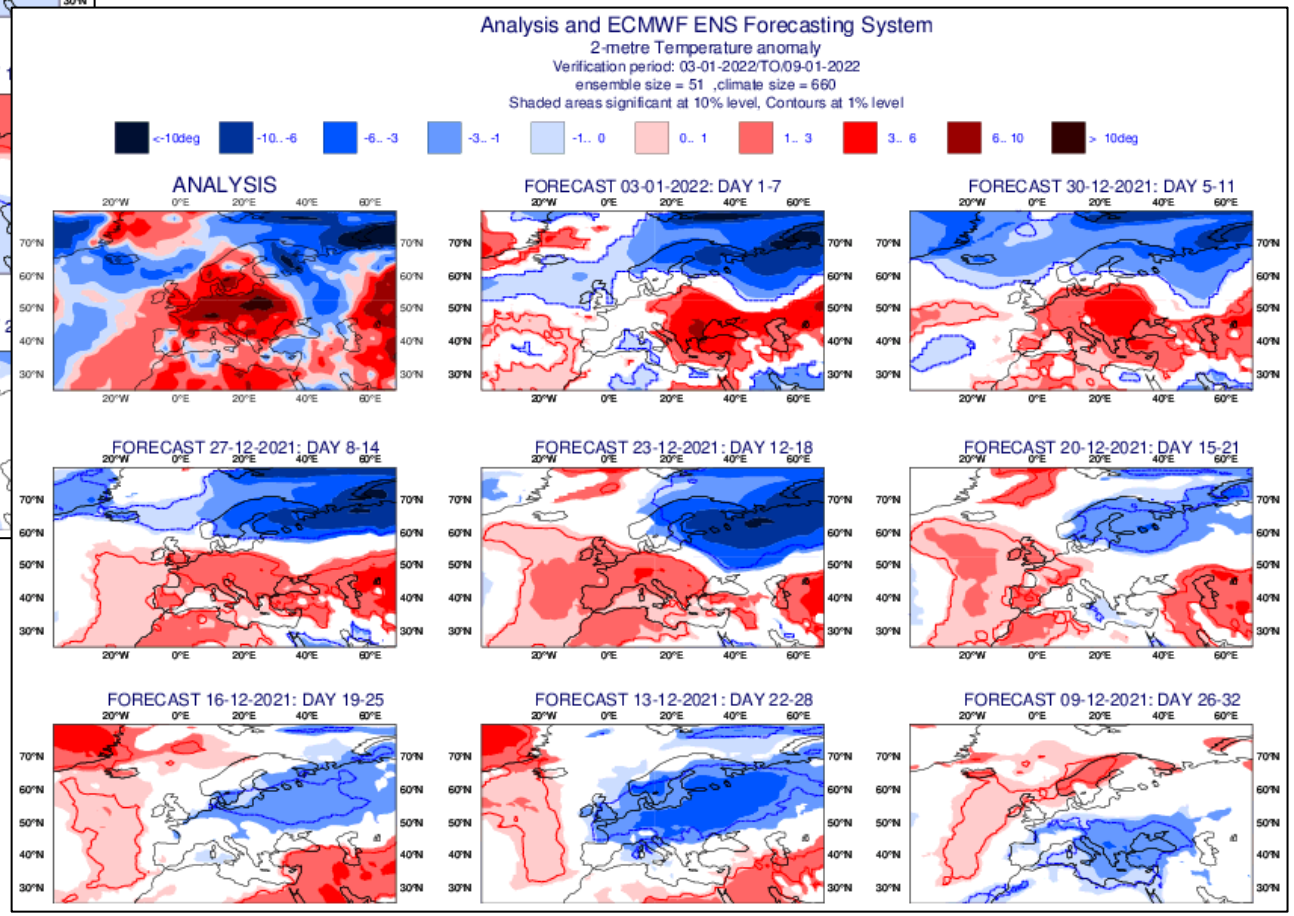
• Run 24.2.2022.
• Sudden switch from NAO+ to Block on 27.02. and Block prevails in the beginning of March
• Signal for regimes transition not present in previous runs in February?



- Not helpful, for sure
- But low probability outcomes will happen at times
- This supports the ECMWF ensemble approach
- If low probability outcomes never occurred the ENS would be criticised for being unreliable
- Key question then is do the low probability outcomes happen *too* often ?

Poor forecasts for cold in Jan towards end of 2021 (MVV Trading GmbH)





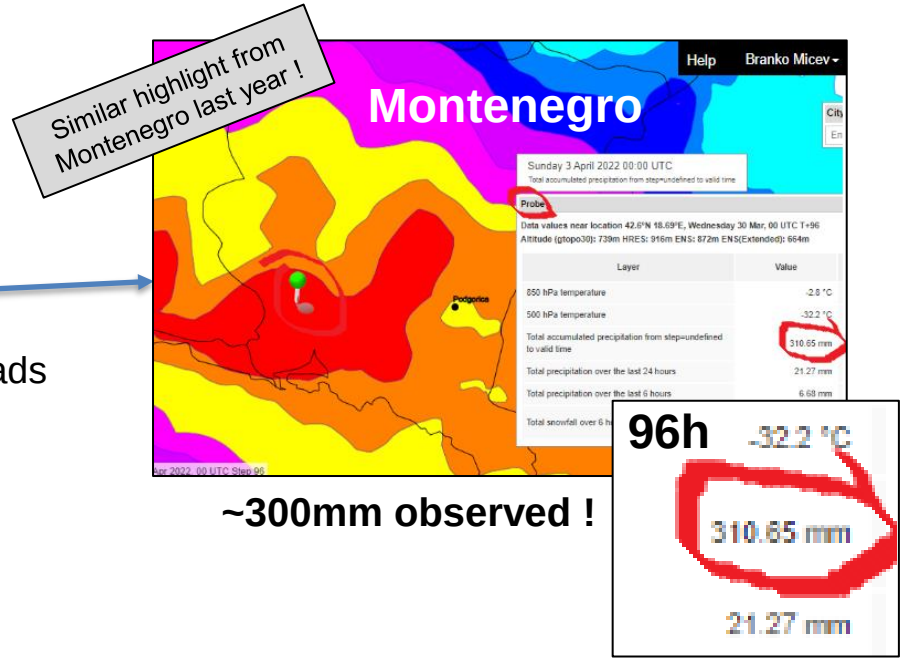
Q5: Have you experienced any notably good forecasts in the last 18 months (e.g. well-forecast events, variables/products performing well)? (1 of 2)

- No/no entry: **32%** (39% in 2021)

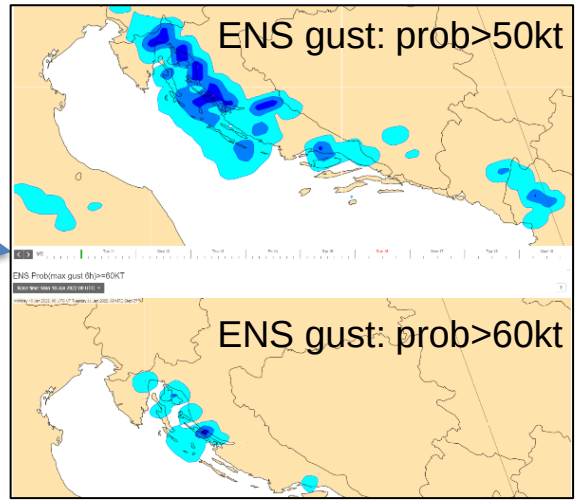
Precipitation
- Synoptically forced convection good
- Extreme rain Montenegro 30 Apr 2022
- August 2021, northernmost Turkey (Bozkurt), flooding rains well handled D1-D4 leads
- Convection in tropics seems better [47r3 impact?]

Temperature
- 2m temperature extremes well handled
- Week 1 cold wave in Georgia well handled (5-12 May 2022)
- May warmth in western Europe well handled

10m winds
- Strong wind event Georgia well-handled at day 2 (28m/s Tbilisi)
- Bora wind case in Croatia – 12 Jan 2022



~300mm observed !

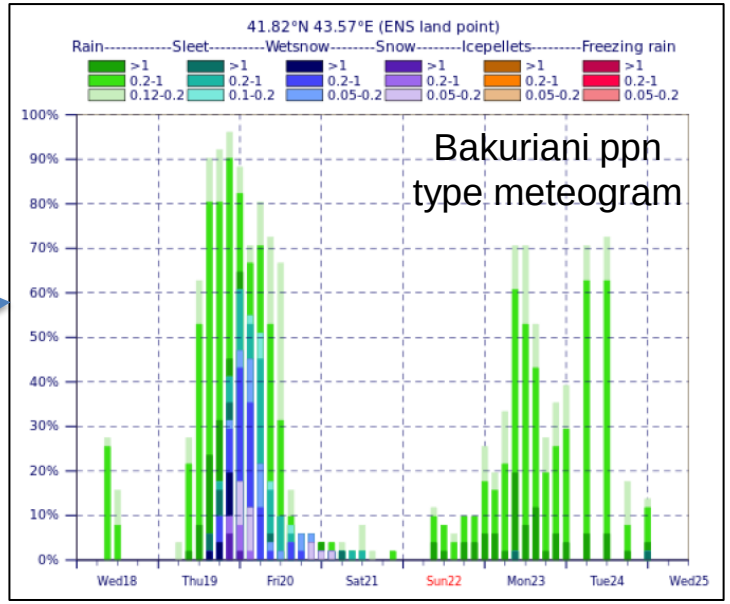


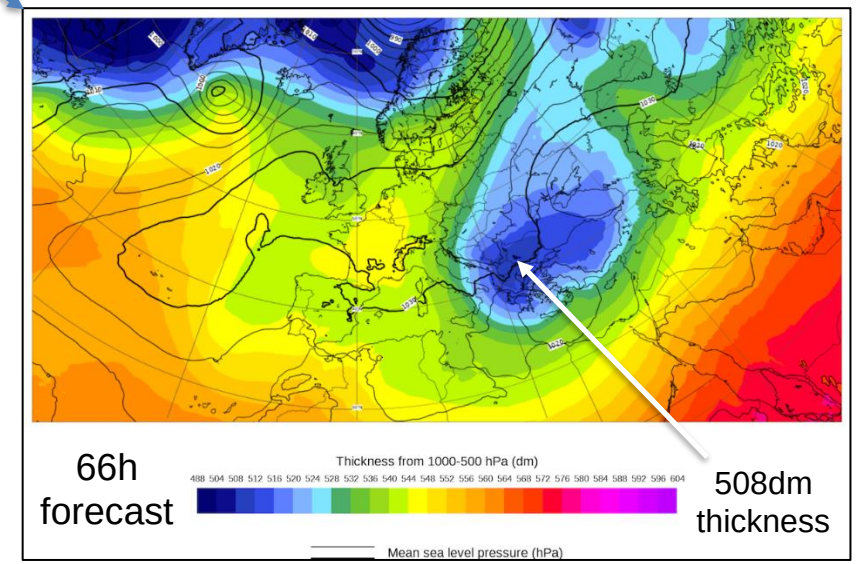
Q5: Have you experienced any notably good forecasts in the last 18 months (e.g. well forecast events, variables/products performing well)? (2 of 2)

Solar Radiation / Cloud
- Highly accurate forecast inputs for solar forecast services
- Cloud cover well-handled

Precipitation Type
- Good guidance overall (Croatia)
- Good guidance of wet snow in May in mountain resort in Georgia
- Accurate spatial description of precip type for snow event in Belgium, 10 Dec 2021

Other
- Great forecast, days in advance, for Athens snow/thundersnow 24 Jan 2022
- Winter polar stratosphere forecasts good
- Westerlies in Feb 2022 well-handled by seasonal forecast
- IFS performs well in westerlies over Georgia





Quotes
- "..we had several extreme weather situations and the EC prognostic products were perfect.." ***Montenegro***
- "..Met Office forecasters anecdotally place a lot of weight on ECMWF output, more so than other non-Met Office centres" ***UK***
- "..ECMWF better than GFS, WRF, ICON for Africa.." ***IGO (?)***

Q6: How could ECMWF improve the way it provides forecast data to users (e.g. new products/parameters, output to support warning issuing and impact forecasts, technical issues, timeliness, cloud services). Given the visualisation theme to UEF 2022 please give careful consideration to how the forecast data is conveyed: graphical formats and styles, map backgrounds, colours, etc. (1 of 2)

Strategy

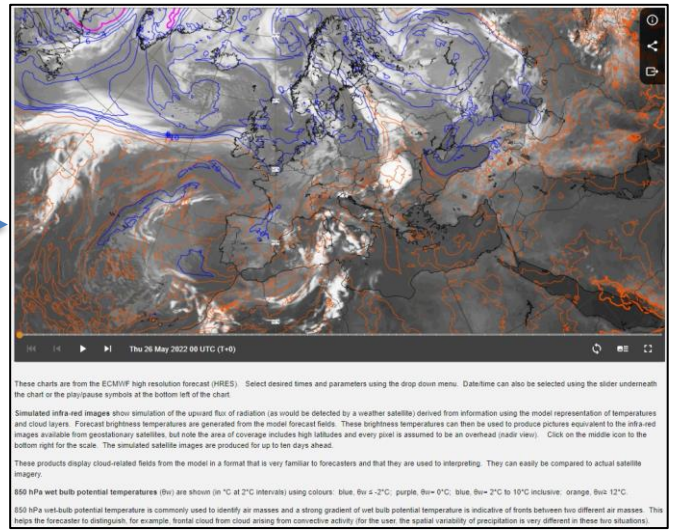
- Impact-based warnings are key nowadays – so partner with other agencies to develop related products
- Dynamic maps in Open Charts [unlikely – ecCharts exists for this purpose]
- More climate-referenced products [such as?]
- Re-forecast data in open charts [presumably means composited data for climatologies?]
- Keep working on earlier delivery

New Initiatives

- Video explanations for products [nice to have, but a big and costly undertaking!]
- How can we disentangle spatial from temporal uncertainties ? [spaghetti fronts may help a bit]

Technical / Data Services

- Grib-2 [working on it!]
- **ecCharts**: adjustable ranges / multiple windows / multi-run views / make easier to use
- More APIs for Open Charts [we have one for downloads already, but please elaborate]
- Remove superfluous corporate info from Open Charts (pdf) downloads
- Create more Open Charts options for registered users

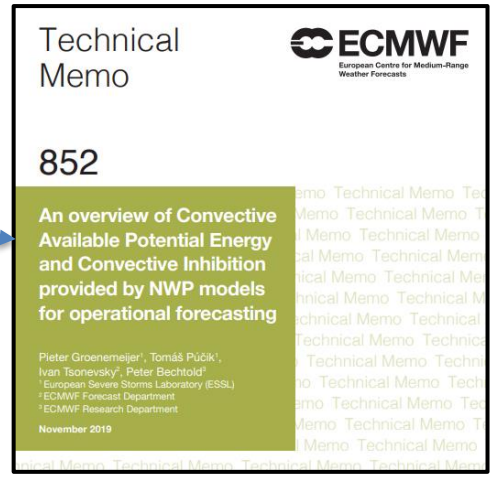


Late in 2020 and early in 2021 ECMWF updated the online documentation beneath each Open Charts offering (hundreds!)

Q6: How could ECMWF improve the way it provides forecast data to users (e.g. new products/parameters, output to support warning issuing and impact forecasts, technical issues, timeliness, cloud services). Given the visualisation theme to UEF 2022 please give careful consideration to how the forecast data is conveyed: graphical formats and styles, map backgrounds, colours, etc. (1 of 2)

New Products

- MLCAPE/MLCIN & SBCAPE/SBCIN [✓ first set available (50 and 100hPa layers), second set not: can be misleading]
- More convective parameters
- Synthetic radar reflectivity [details?]
- MSLP plumes
- Low/Medium/High cloud [✓ available]
- Aircraft icing
- Atmospheric Angular Momentum
- More stratosphere-relevant fields (e.g. energy fluxes, QBO-related)
- Renewables variables for extended range (monthly) forecasts – solar and hub-height winds
- Learn from / adopt USA SPC (Storm Prediction Centre) online visualisation tools – e.g. MUCAPE on a hodograph
- Height above sea level, not earth's surface, for wet-bulb temperature = 1ºC


Technical Memo

ECMWF
European Centre for Medium-Range Weather Forecasts

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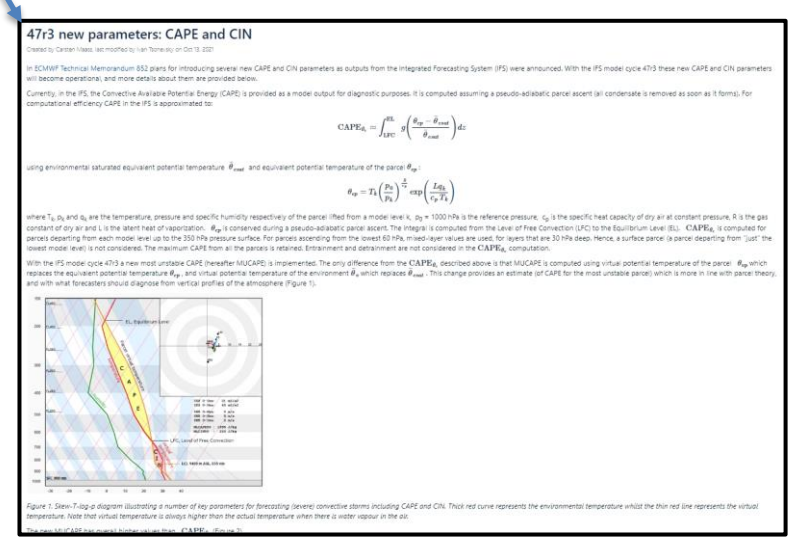
An overview of Convective Available Potential Energy and Convective Inhibition provided by NWP models for operational forecasting

Pieter Groenemeijer[1], Tomáš Púčik[1], Ivan Tsonevsky[2], Peter Bechtold[3]
[1] European Severe Storms Laboratory (ESSL)
[2] ECMWF Forecast Department
[3] ECMWF Research Department

November 2019

https://www.ecmwf.int/en/elibrary/19278-overview-convective-available-potential-energy-and-convective-inhibition-provided

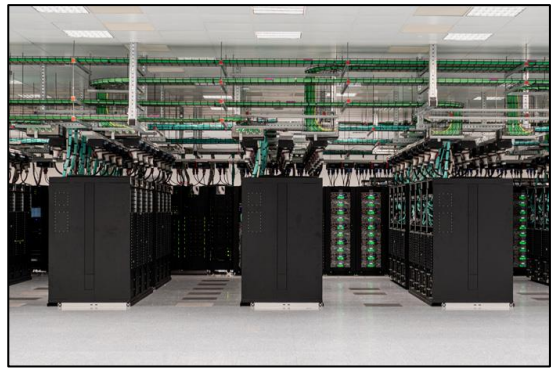

47r3 new parameters: CAPE and CIN

https://confluence.ecmwf.int/display/FCST/47r3+new+parameters%3A+CAPE+and+CIN

Q7) In the next version of the operational ECMWF model (cycle 48r1, to go live early in 2023) there will be some significant changes: The ENS will go to 9km resolution (now 18km); HRES will not change its resolution, so will deliver basically the same forecast as the new Control run (although we will not 'retire' HRES as such); The Extended range 45-day forecast will be run daily at 36km, from an 00UTC data time, with 100 members, completely separate from the 15-day 9km 50-member twice-daily ENS; A new and separate 45-day re-forecast dataset will be created at 36km resolution to support the new extended range products (whilst the re-forecasts to support the 15-day ENS products will run at 9km for just 15 days). Do you have any comments on these initiatives and on how you might like ECMWF to adapt its products to accommodate the changes? Also, do you plan to change your own procedures to deal with these changes, and if so how? (1 of 3)

48r1 changes

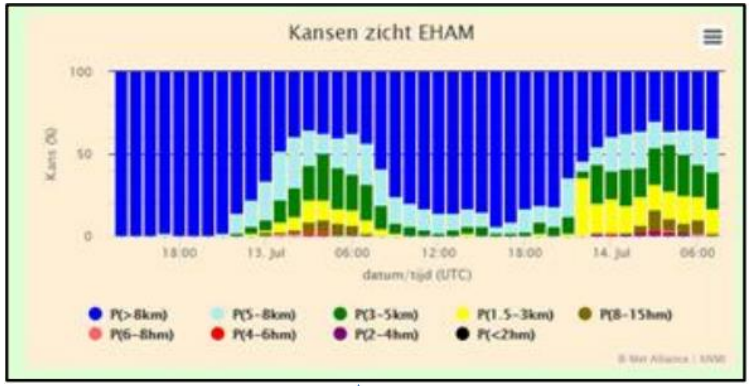
- ENS @ 9km to D15
- HRES = CONTROL
- EXT daily 00UTC runs
- EXT 36km from D1
- EXT 100 members
- 2 reforecast sets (MR & EXT)



ATOS HPC in Bologna

Q7) …reactions to 48r1... (2 of 3)

Example from KNMI



Express support for these changes : **16%** (and not really any dissenting voices)
No comment / no reply: **48%**

- Data volumes going up, we need to adapt, its challenging! **3**
- “This is very ambitious. Good luck!”
- “Please can you describe in detail your plans”
- No action taken yet

<u>Medium (+Short) Range changes</u>

- May lead to user’s short term forecasts starting to reference ENS (e.g. for airport visibility) [visibility meteogram planned]
- Looking forward to better resolution of topography in ENS
- 9km ENS should improve forecasts a lot
- So, justification now for more convection-related parameters (e.g. supercell tracks) ?
- Can we have more visualizations related to cyclone tracks? [nothing planned as yet]
- Will forecasts beyond Europe improve as a result (to match European skill) ? [yes and no]
- With ENS at 9km why would Member States run LAMs? [many LAMs are now @ ~2-5km resolution]
- We have no plans to use any ENS data
- Will HRES be retired after 48r1 ? [plans undecided as yet]

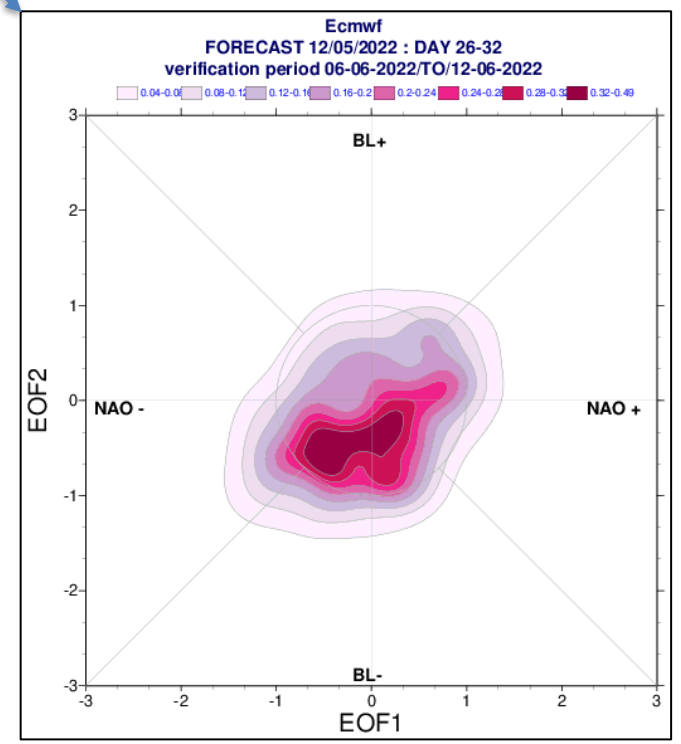
Q7) …reactions to 48r1... (3 of 3)

Extended Range changes

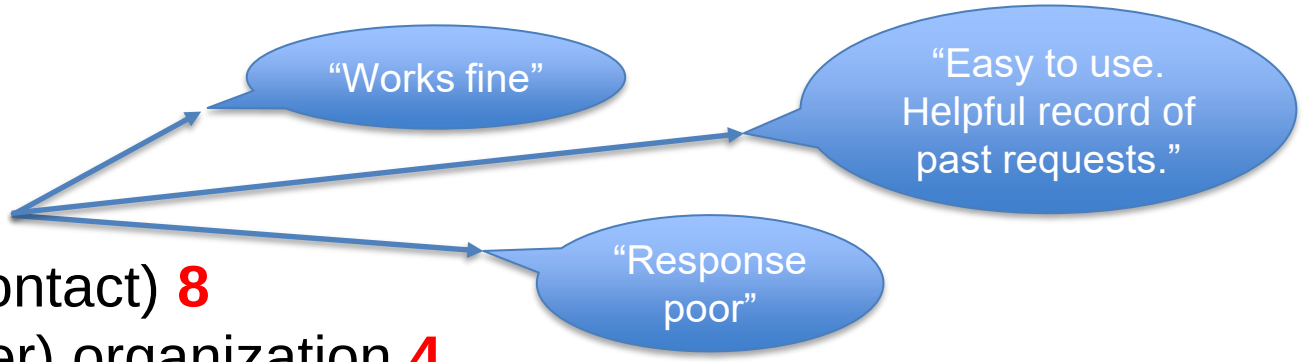
- Will lead to more use of Extended Range forecasts
- There is big interest in 45 day forecasts
- For the ENS, will there be automatic feed of 100 members' data where now we get 50?
- As more data to download, need more pre-computation (or on-the-fly options) for stats like means
- Daily runs will be good for power market modelling
- Visualisations will need more than ever to compress data (e.g. as in 2D regime phase diagrams)
- Will need to adapt member weightings in our multi-model output
- Why daily issue?

Re-forecast changes

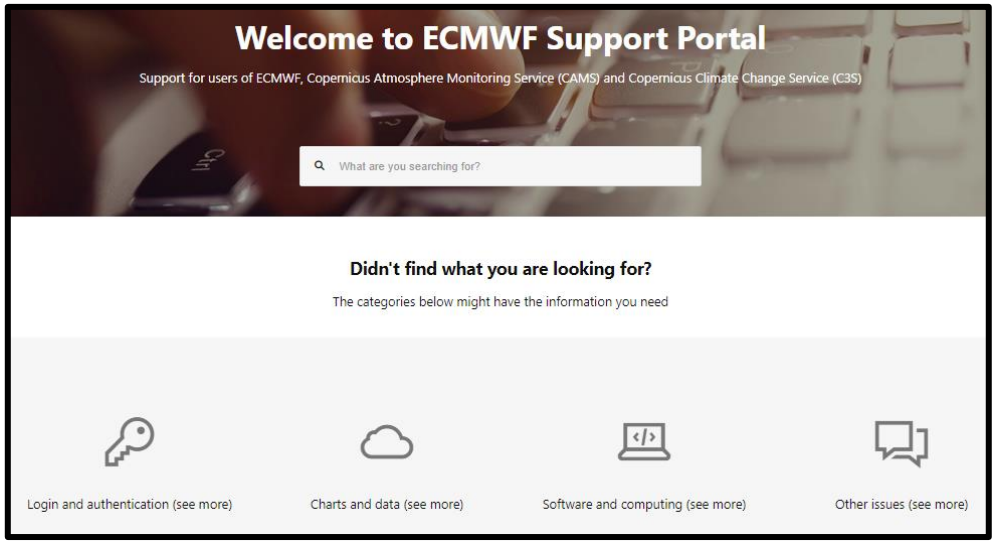
- *No comments received on this!*
- *Does this imply a lack of awareness, or that it is not a problem?*



Q8) How do you contact ECMWF if you experience a problem with our forecasts (quality and/or products)? We are trying to understand any issues you face in contacting ECMWF and appreciate any feedback you have on this.

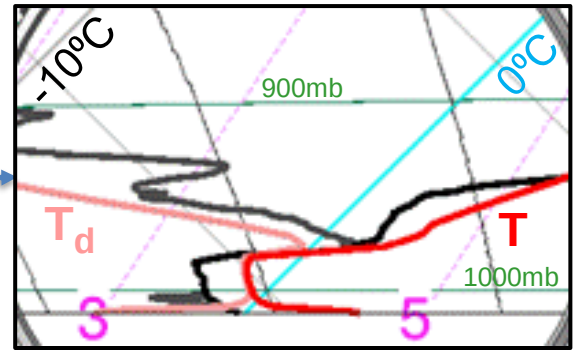


- Using the ECMWF Support Portal **11**
- By email (to e.g. a known ECMWF contact) **8**
- Via someone in their own (or a partner) organization **4**
- Service desk / operators (phone?) **3**
- Through the forecast user forum **2**
- Data services
- ECMWF comms team
- Various ways
- Online support is usually sufficient



https://confluence.ecmwf.int/site/support

9a) Please use the box below if you have additional comments on topics that have not been covered in any of the questions above.



Observed (black) & forecast

Positives

- Well done ECMWF ! **4**
- Thanks for fixing the fog issue promptly [low RH in thick fog]

Requests

- Please continue to extend your open data policy [yes!]
- Can we have “ensemble sensitivity analysis” diagnostics, for Europe ?
- Would like to collaborate on AI topics (Israel)
- Wish for integration of aerosol into meteorological models [C-IFS]
- We are interested in re-analyses and model validation
- Please provide more precipitation and wind forecasts products (for extreme events)

Negatives

- Unresolved issue regarding multiple users on one ecCharts account (Croatia Control)
- EcCharts/website logging in process clunky. Usually works but frustrating when it doesn’t. Please aim for 100% reliability (UK)

Summary of Main Messages

User Voice Corner

- Satisfaction with ECMWF forecasts and products is generally very high
- Expectations continue to grow !
- New ECMWF co-operating state – Georgia – making us now think about “new” issues (e.g. Caspian Sea)
- Reduction in reports of model issues looks encouraging
- Wide range of severe events for which ECMWF forecasts were praised
- Users still pick up more on longer range forecasts that ‘go wrong’
- ECMWF needs to investigate / work on some ‘details’ related to products / output
- Views on Open Charts seem to have improved (more negatives last year)
- Big upcoming IFS changes (48r1) cautiously welcomed
- User Portal is, overall, used and liked
- Technical Issues of various types continue to crop up
- Nice to see overall response rate has picked up after last year…

Breakout Groups - 16:00 UK time

A chance to quiz ECMWF experts directly, or deliver requests, feedback etc…

Meeting Room 1: 1. Technical topics (e.g. data, ecCharts, Open Charts, 48r1 changes, new HPC, MARS move)

(Cihan Sahin, Sylvie Lamy-Thepaut (*remote*), Daniel Varela Santoalla, Emma Pidduck, Jenny Rourke, +…)

Meeting Room 2: 2. Extended Range and Seasonal

(Tim Stockdale, Frederic Vitart, Fernando Prates (*remote*), Anca Brookshaw (*remote*), +…)

Weather Room: 3. Model / Forecast / Product topics

(Linus Magnusson, Ervin Zsoter, Richard Forbes, Ivan Tsonevsky (*remote*), +…)

Please "drop by" any of the above that interest you – you can go to more than one!

Following on...

- **Breakout Group Summary** bullet points will be posted online in due course, in the Forecast_User portal:
  - Will primarily cover new requests and any unanswered questions
  - check/"watch" the forecast user blog for notification - https://confluence.ecmwf.int/pages/viewrecentblogposts.action?key=FCST)