

FORECAST IN KOSOVO

Fairmode meeting CT3

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**Economy and
Environment**

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AQ Forecast in Kosovo

Kosovo forecast objective:

- The main purpose of the forecasting system was to provide Kosovo citizens with adequate hourly air quality information and **health advice**. European AQI has been used.
- The quality objective of the forecast system was focused on the questions:

Does the model forecast AQI level properly especially for poor and higher AQI level?

Are citizens warned against high pollution episodes?

Analyses based on data from Kosovo Air Quality Portal developed under the project: Supply of project management, air quality information management, behavior change and communication services.

- *Contracting Authority: MFK - Millennium Foundation of Kosovo*
- *Sponsor USA: MCC – Millennium Challenge Corporation USA*

Air Quality Portal (rks-gov.net) - <https://airqualitykosova.rks-gov.net/en/>

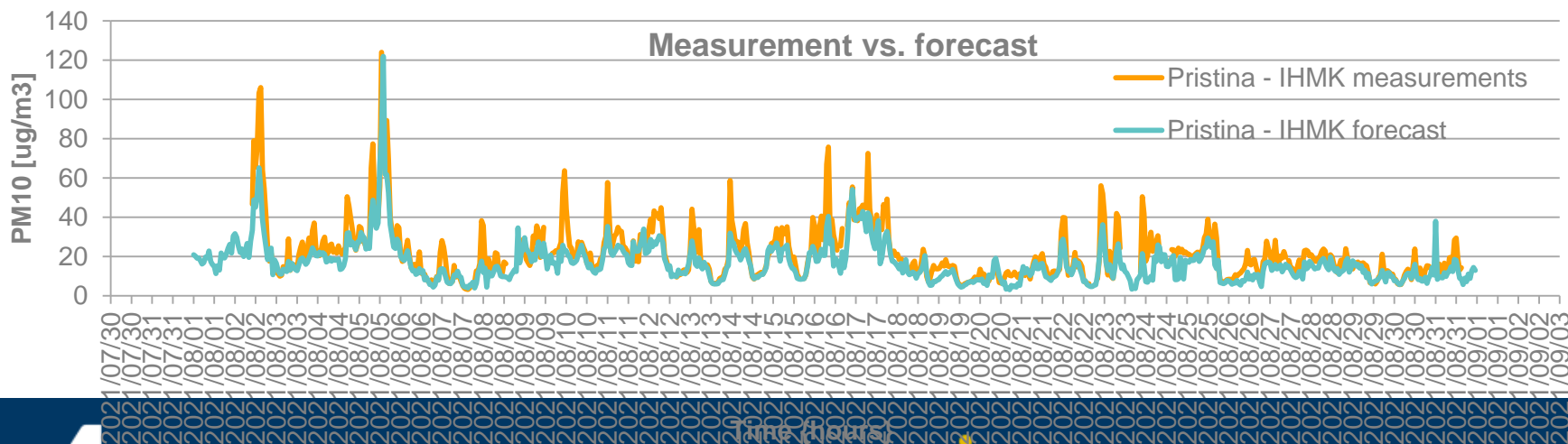
Forecast verification

Current additional AQI indicators :

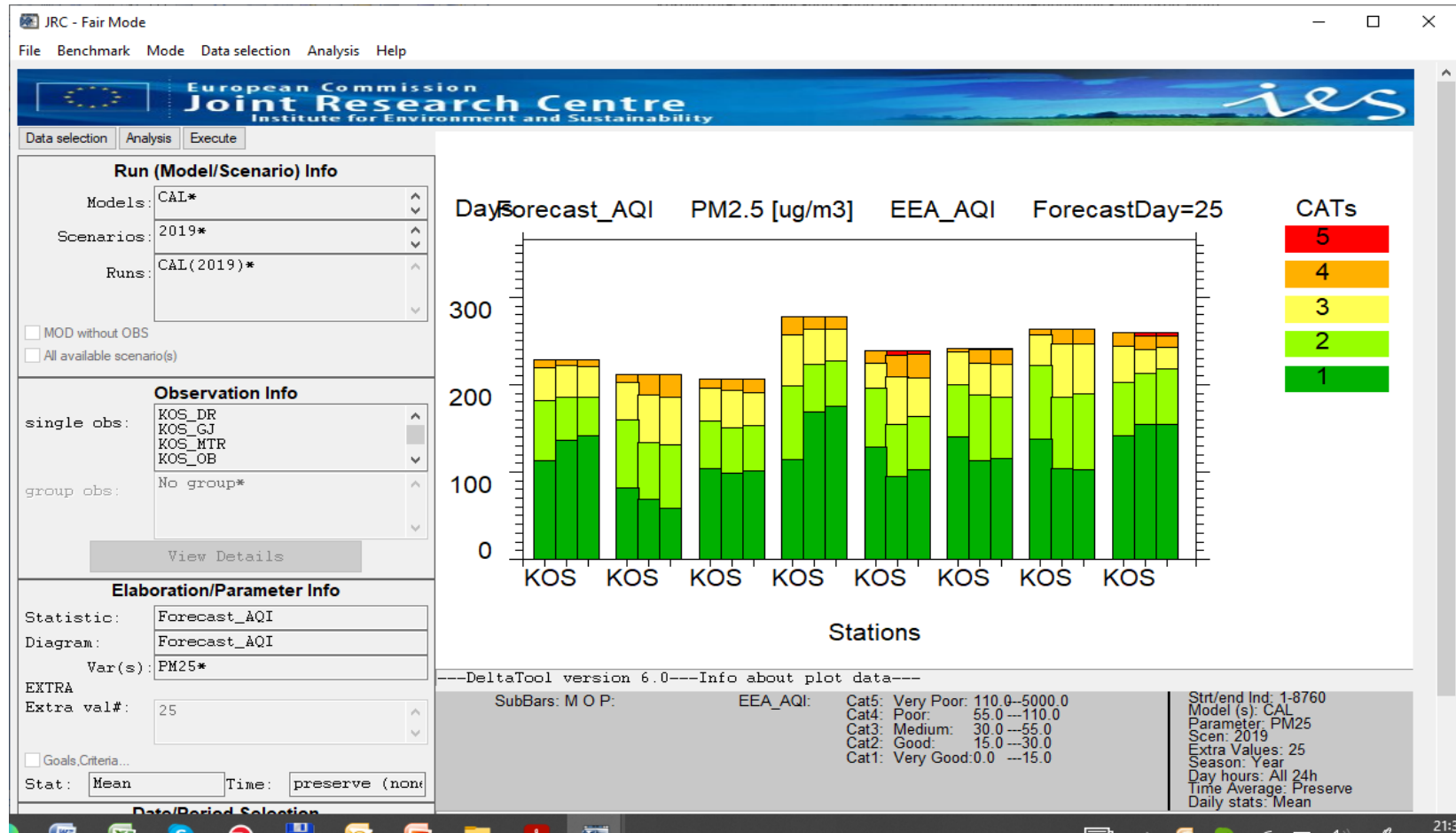
- compatibility of AQI [%]
- [%] of cases with 2 level difference of AQI
- correct identification of the main pollutant [%]
- overestimation of AQI [%]
- underestimation of AQI [%]
- GSS: Gilber Skill Score:

$$GSS = \frac{a}{a + b + c}$$

Indicator	IHKM Pristina	Pristina - Rilindja
compatibility of AQI	72%	77%
% of cases with 2 level difference of AQI	1%	1%
correct indentifaion of the main pollutant for AQI	65%	74%
overestimation of AQI	21%	6%
udnerestimation of AQI	19%	22%
GSS >= moderate	0,43	0,46
number of cases	60	131
GSS >= poor	0,00	0,06
number of cases	13	31
GSS total	0,42	
number of cases	789	



DeltaTool forecast used in Kosovo



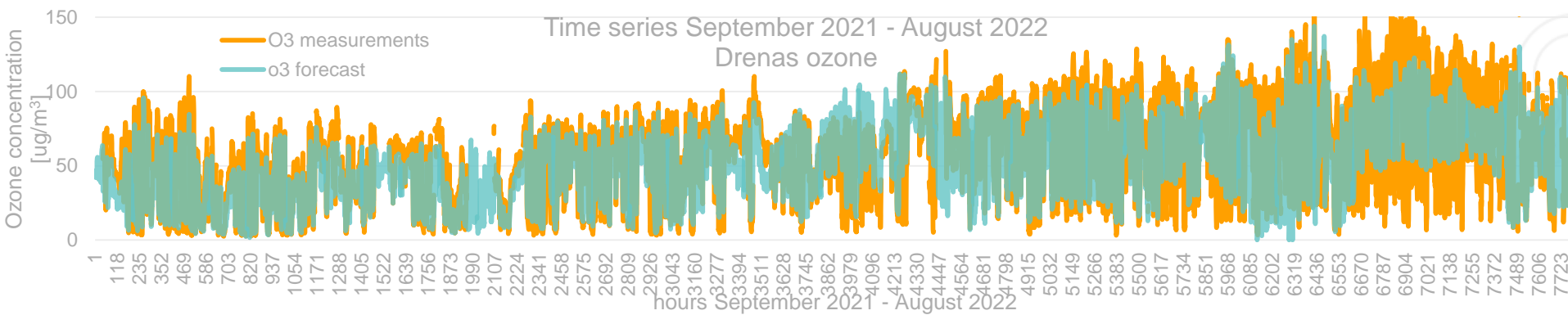
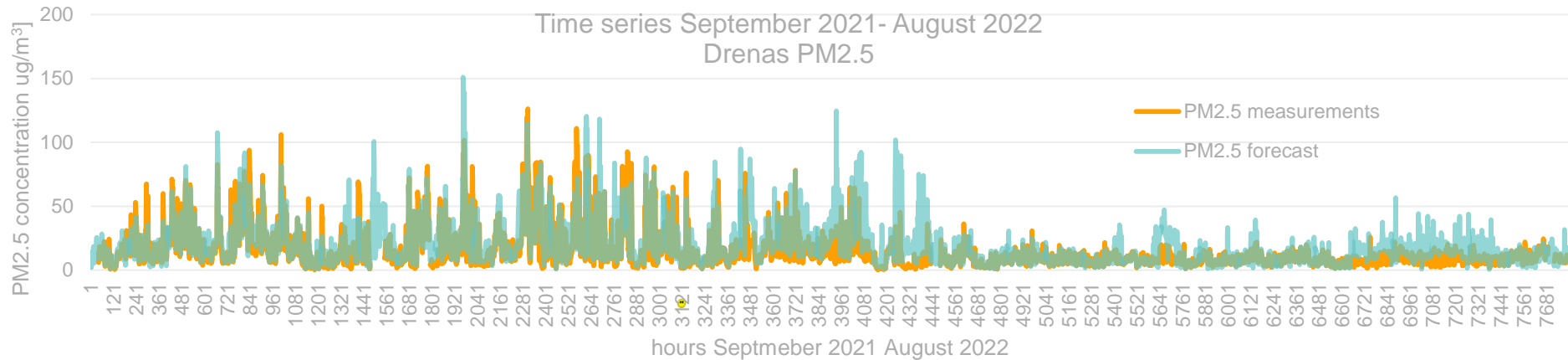
AQI Issues – exercise

- What AQI methodology to choose – European one?
- How should we investigate AQI indicator?
 - Separately for each pollutant?
 - Include all measured/forecasted pollutants and in accordance with EU AQI methodology?
- Should AQI indicator be corelated with time?
- Should we focused only at higher levels of AQI - problematic to humans health?
- Do we calculate the AQI if data for any of leading pollutant is missing?

AQI Issues – exercise

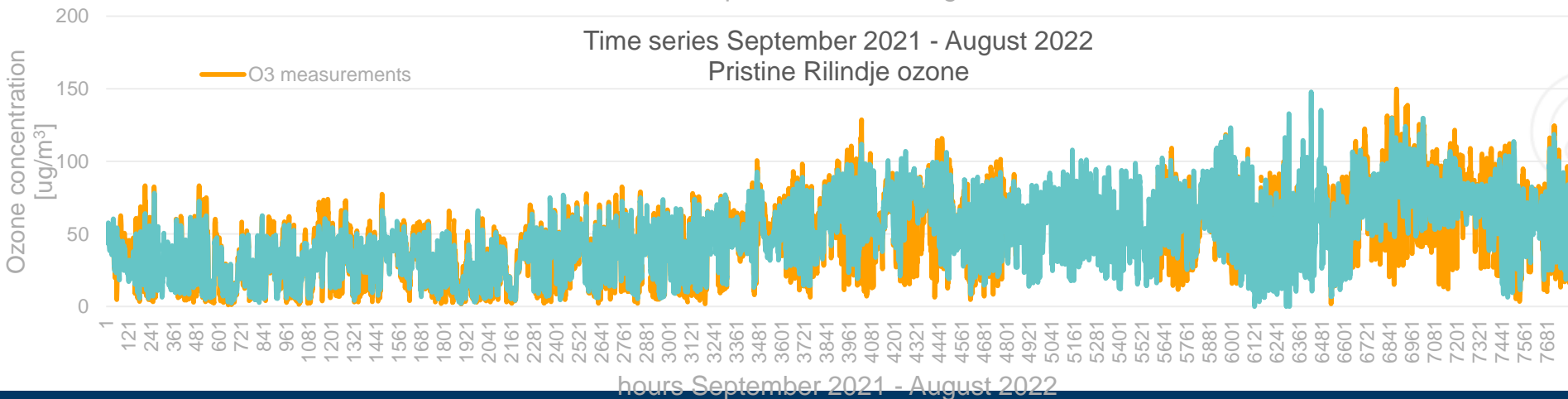
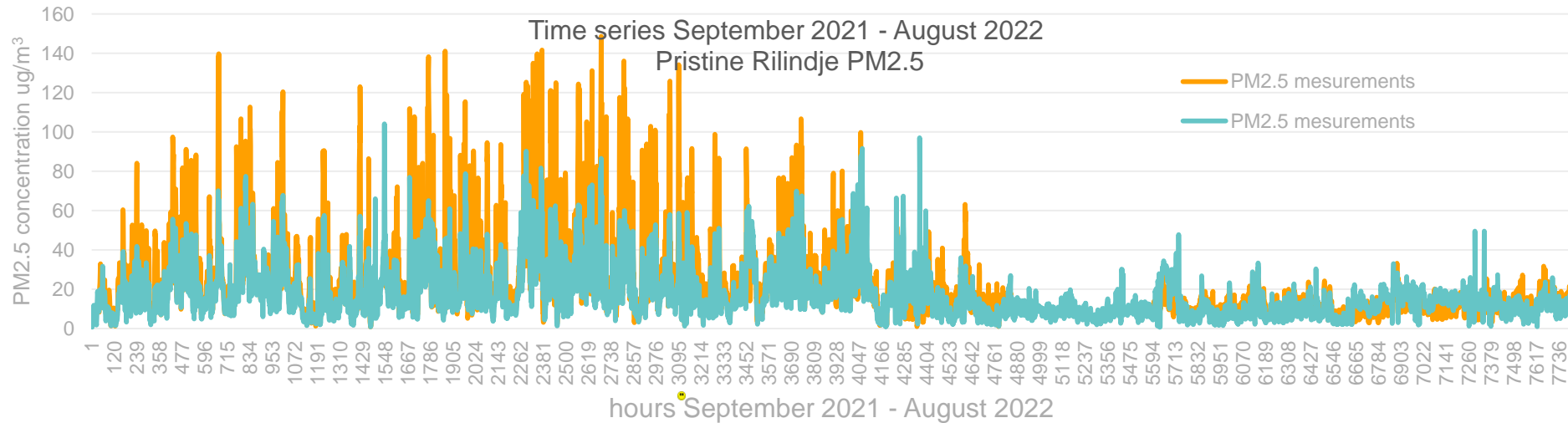
Excercise for Drenas – city in Kosovo

- AQI – EEA methodology
- For AQI there are 2 leading pollutants: ozone in summer and PM2.5 during the rest of the year



AQI Issues – exercise

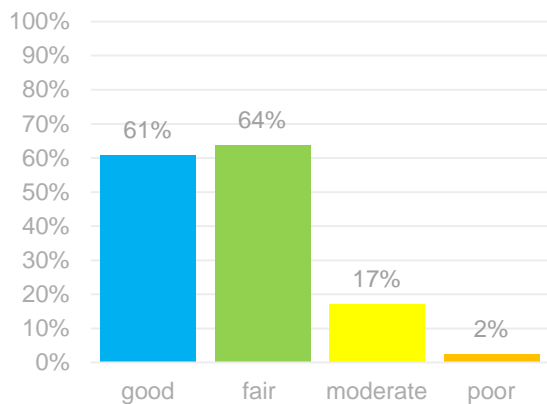
Excercise for Pristina Rilindje – capital city of Kosovo



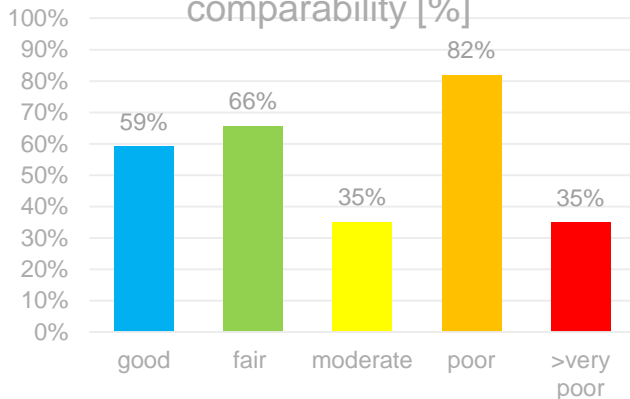
AQI Issues – exercise

Comparison of AQI calculated separately for each pollutant and final AQI presented at portal for public

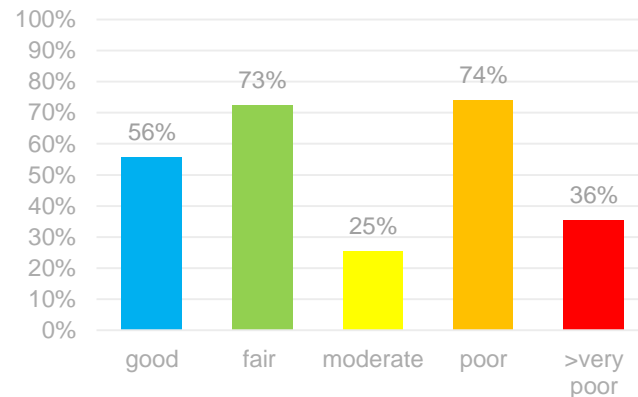
Ozone comparability [%]



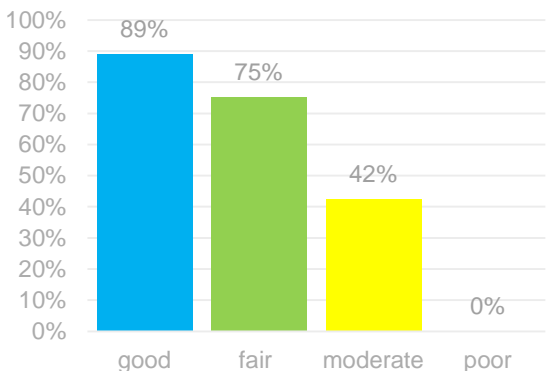
Drenas PM2.5 comparability [%]



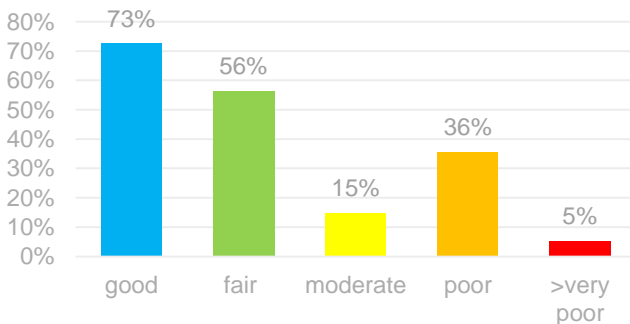
AQI comparability [%]



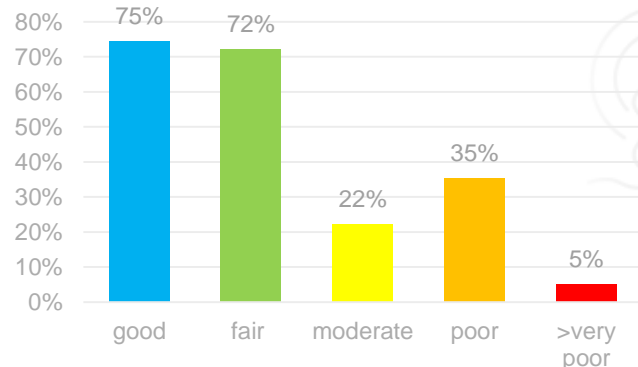
Ozone comparability [%]



Pristine Rilindje PM2.5 comparability [%]

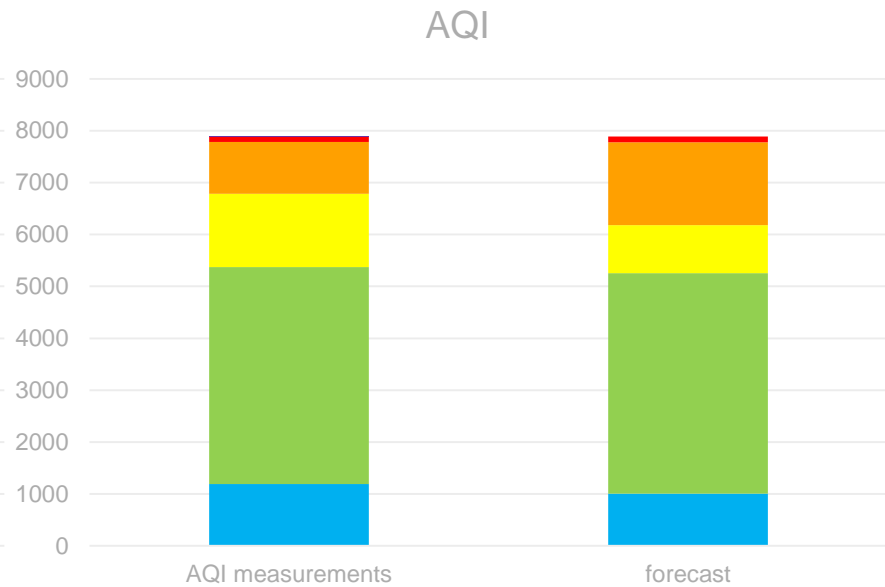
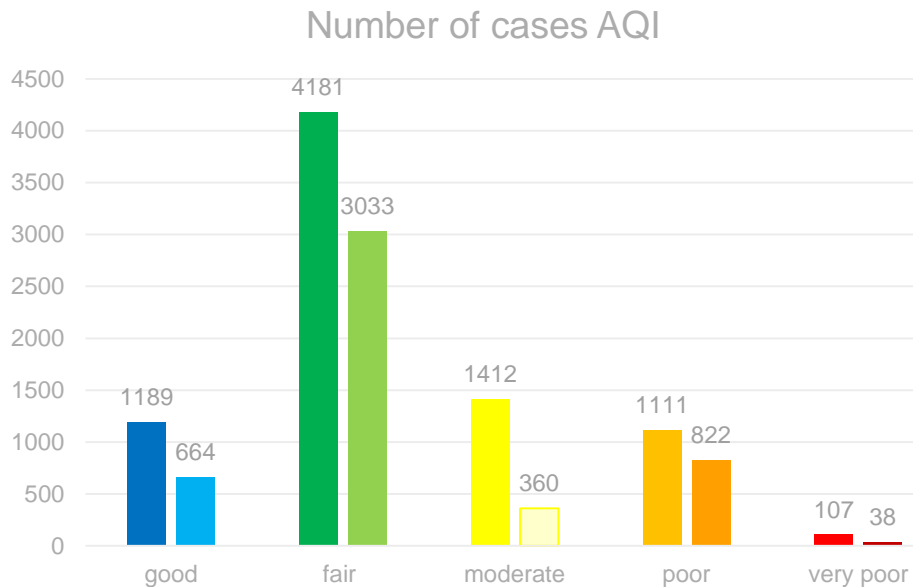


AQI comparability [%]



AQI Issues – exercise

Comparison of AQI with correlation with time and without- (Drenas)



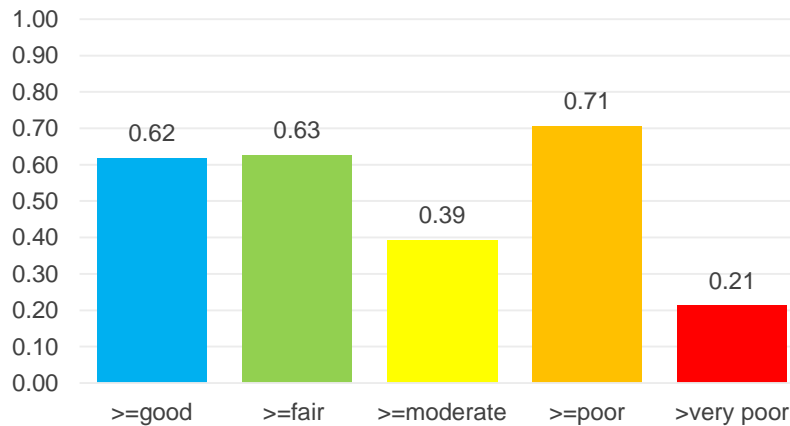
Measurement - left column, forecast right column

■ good ■ fair ■ moderate ■ poor ■ very poor ■ extremely poor

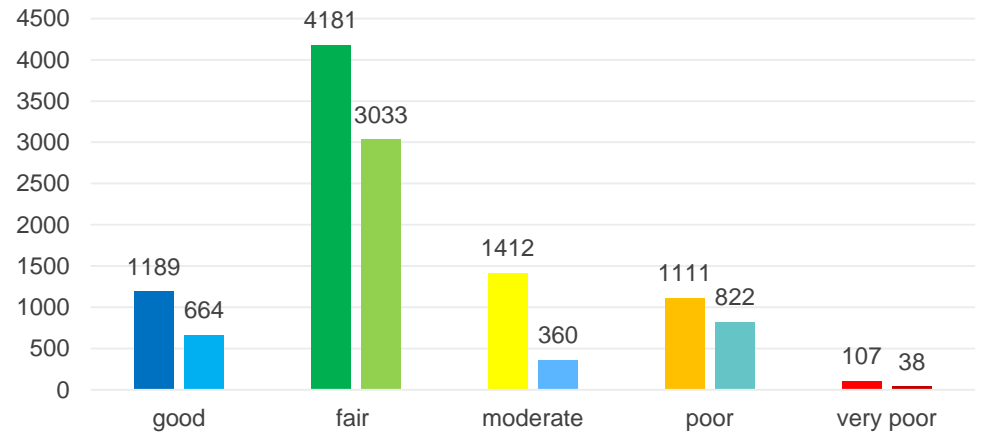
AQI Issues – exercise

Which AQI indicator is the best (Drenas)?

GSS AQI

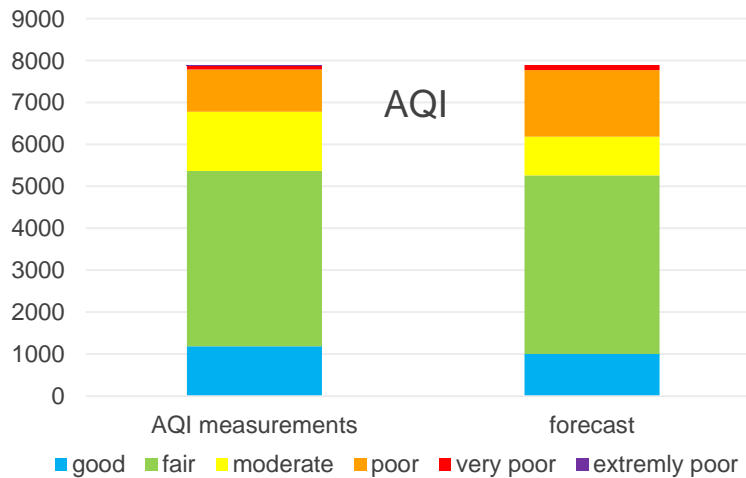


Number of cases AQI

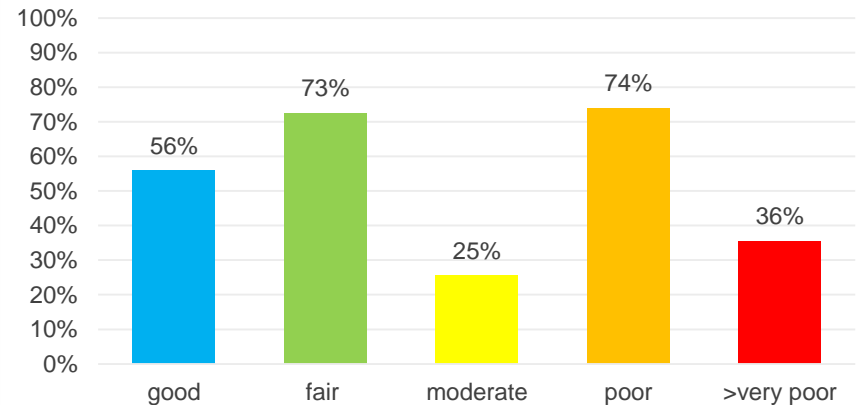


Measurement - left column, forecast right column

AQI



AQI comparability [%]

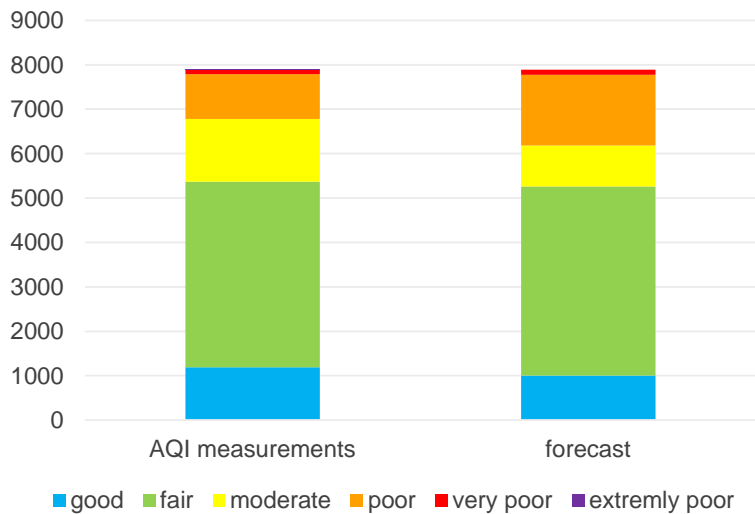


AQI Issues – exercise

- How do we know that our forecasting **properly** predict AQI
- Which level is **OK**?

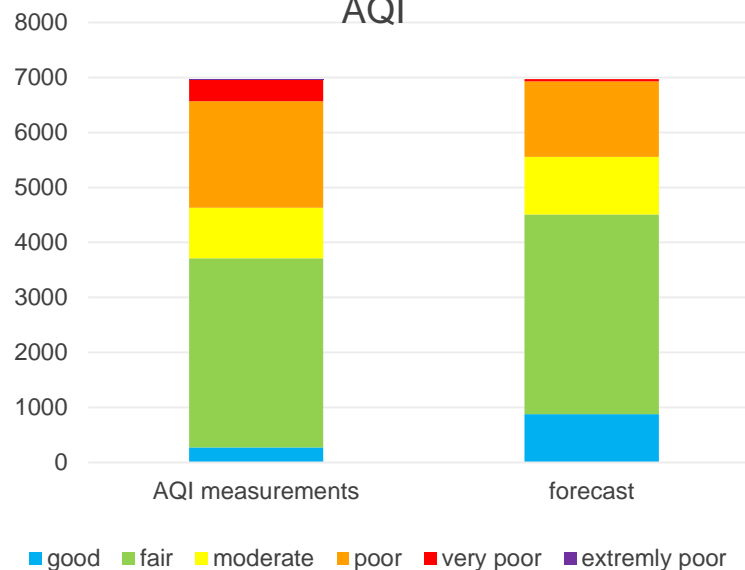
Drenas

AQI



Pristine Rilindje

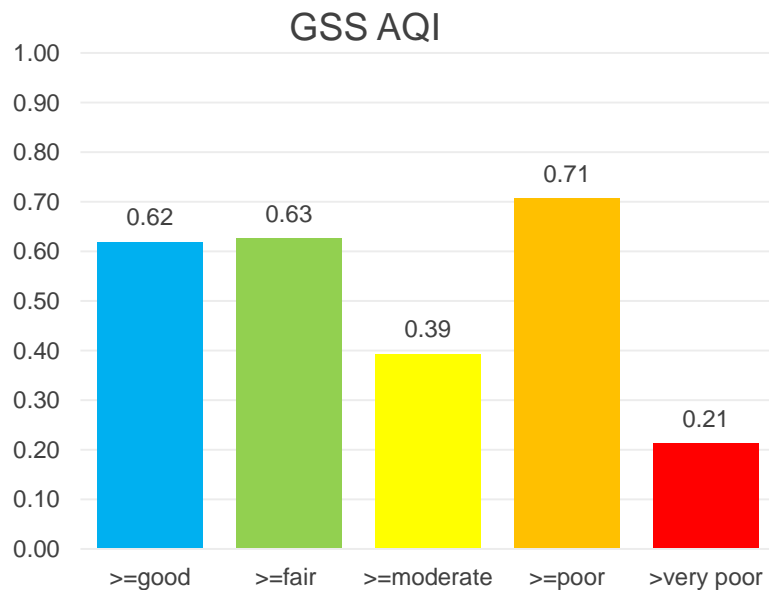
AQI



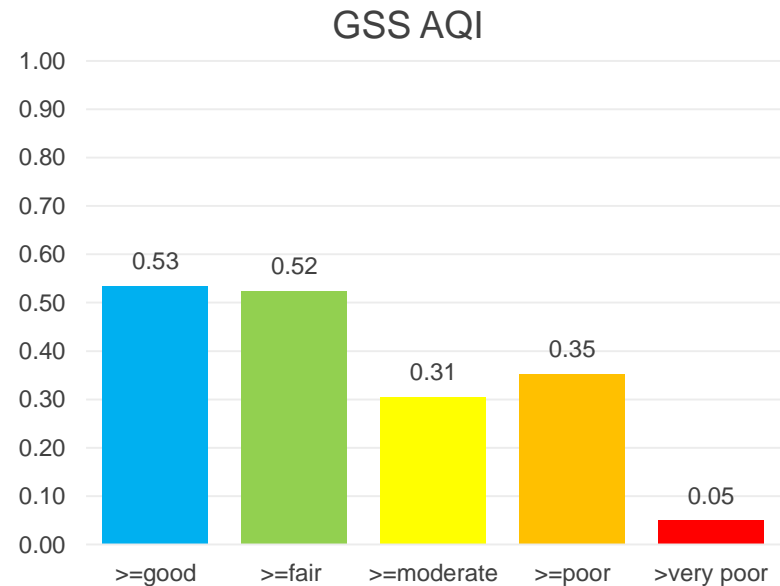
AQI Issues – exercise

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Drenas



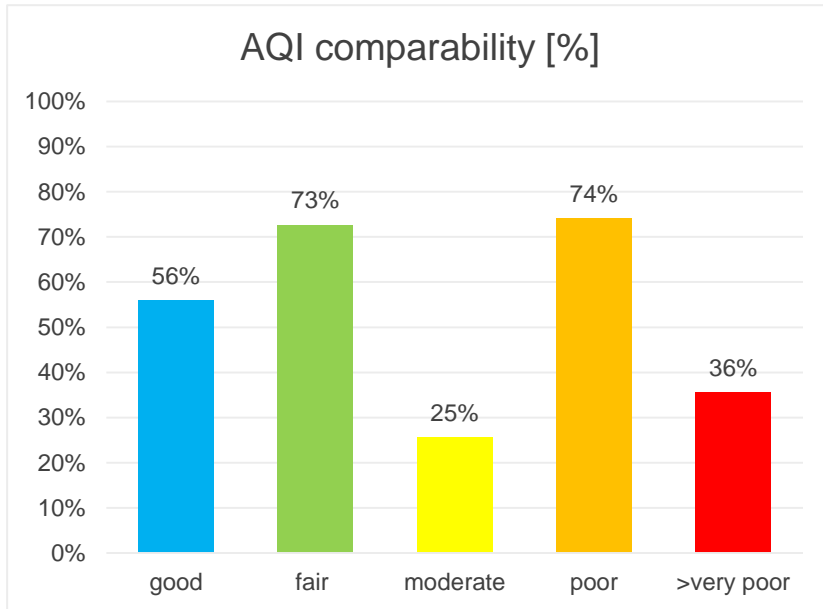
Pristine Rilindje



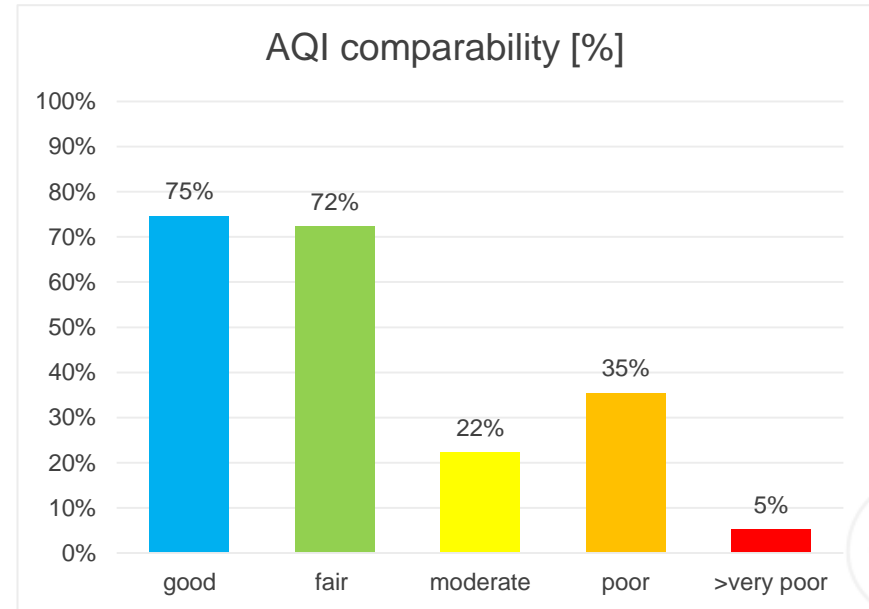
AQI Issues – exercise

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Drenas



Pristine Rilindje

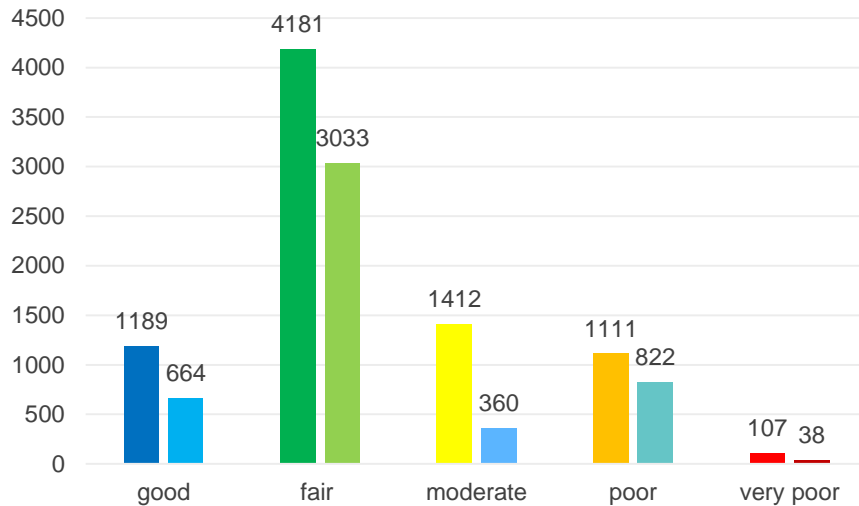


AQI Issues – exercise

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Drenas

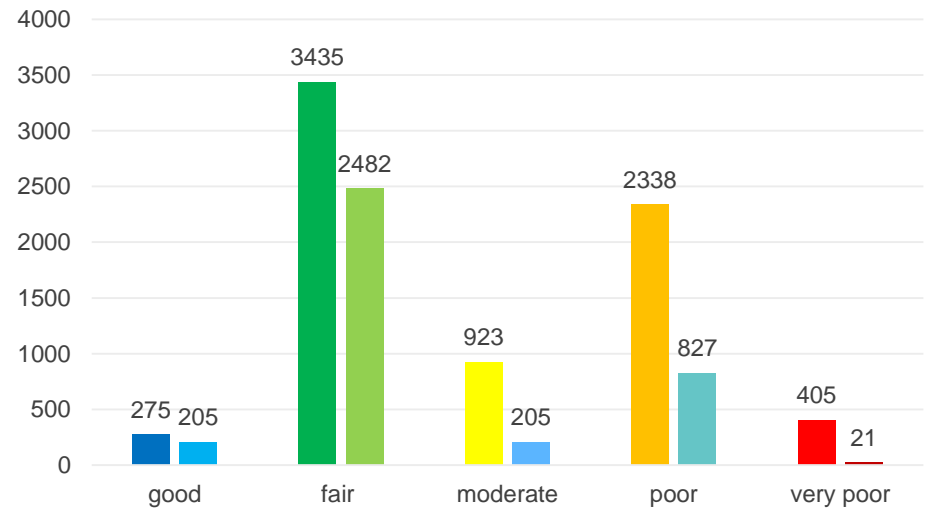
Number of cases AQI



Measurement - left column, forecast right column

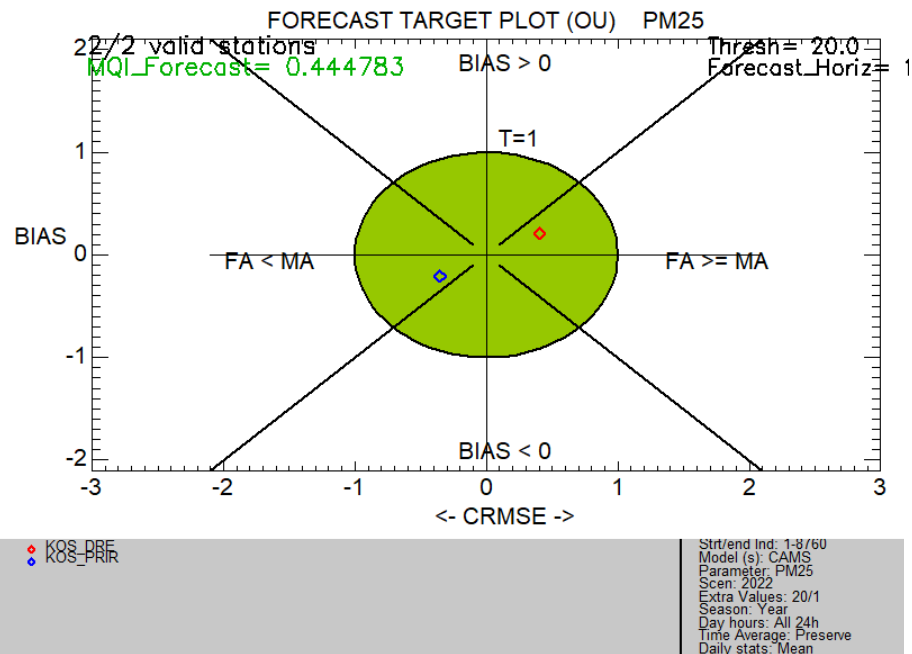
Pristine Rilindje

Number of cases AQI

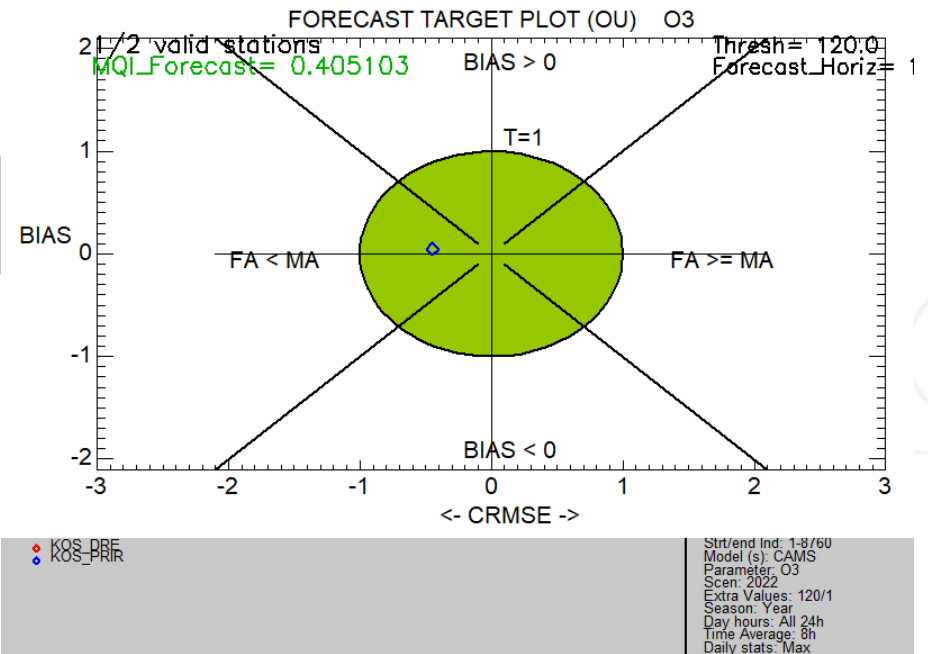


Measurement - left column, forecast right column

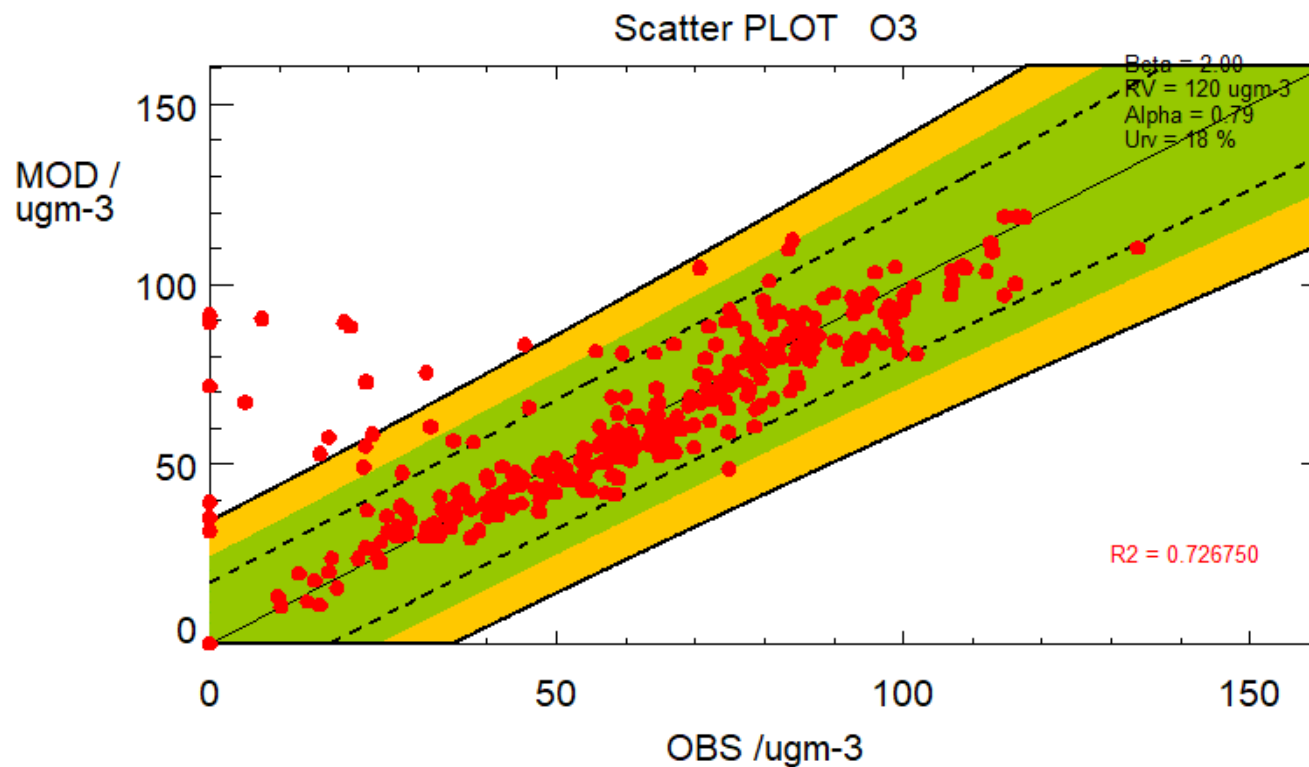
Forecast for Kosovo - Delta Tool excercise



Excercise for 2 cities
from September 2021 to
August 2022

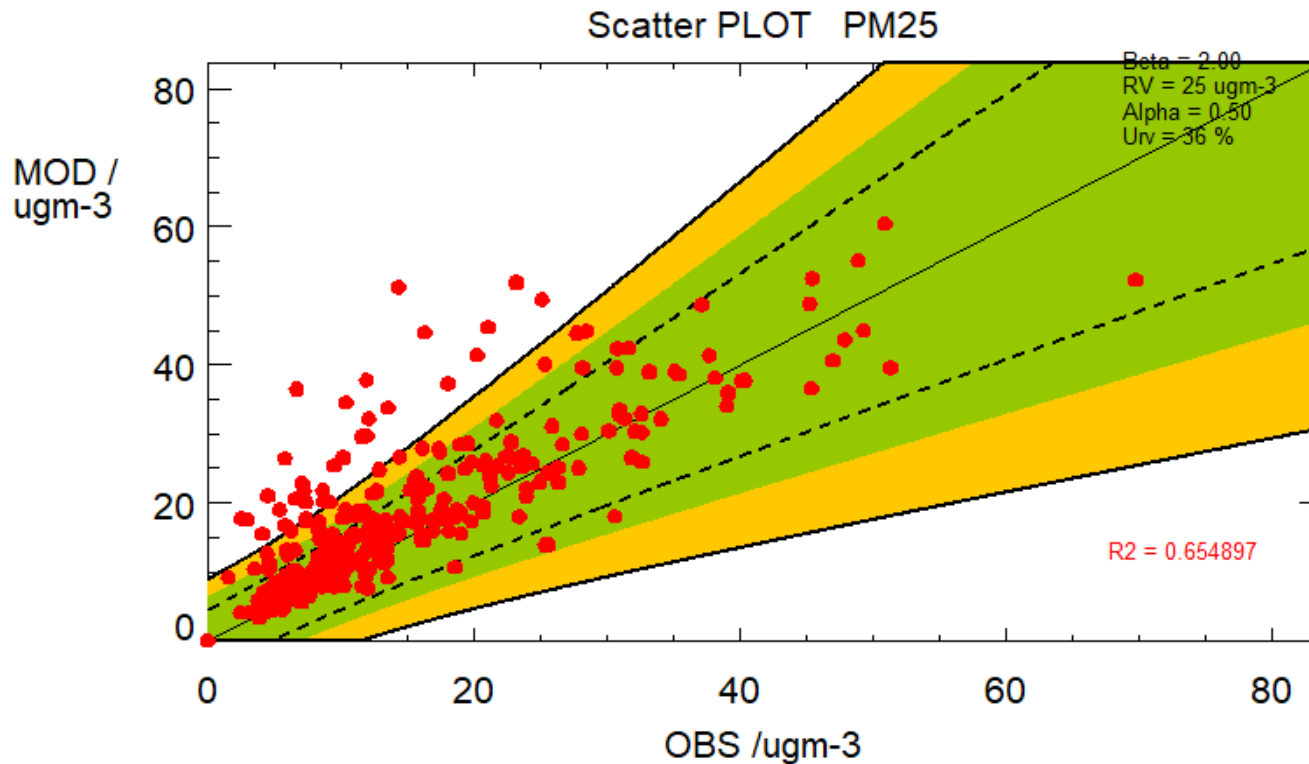


Forecast for Kosovo - Delta Tool exercise



Strt/end Ind: 1-8/60
Station: KOS_PRIR
Model (s): CAMS
Parameter: O3
Scen: 2022
Extra Values: No
Season: Year
Day hours: All 24h
Time Average: 8h

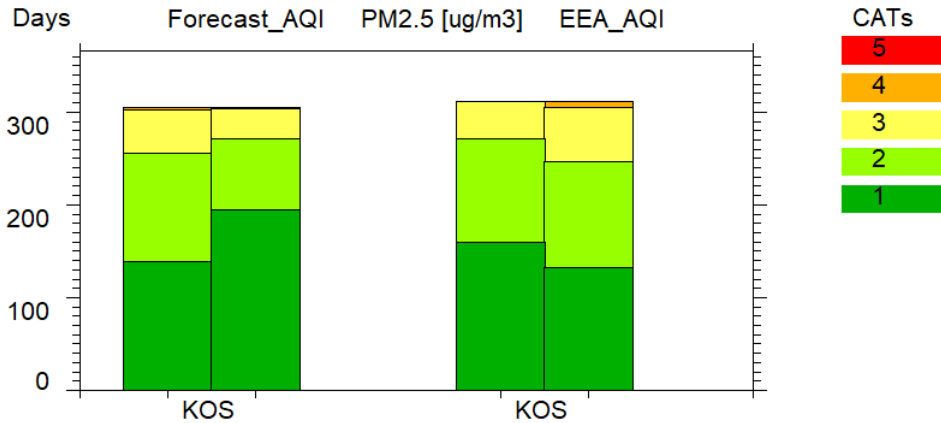
Forecast for Kosovo - Delta Tool excercise



• CAMS

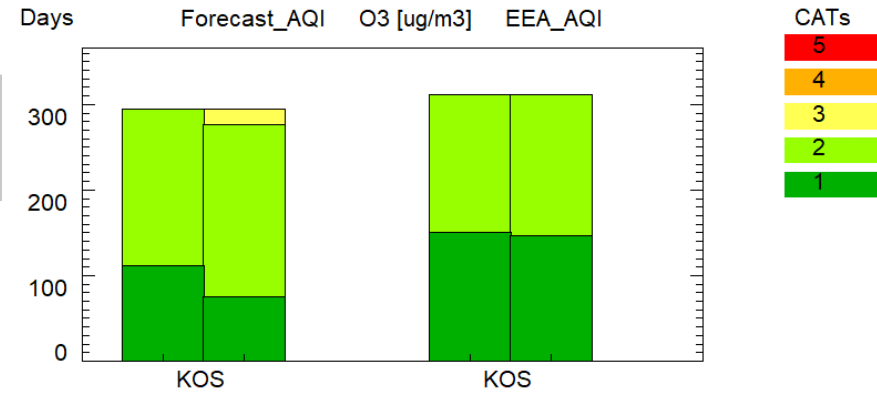
Strt/end Ind: 1-8/60
Station: KOS_DRE
Model (s): CAMS
Parameter: PM25
Scen: 2022
Extra Values: No
Season: Year
Day hours: All 24h
Time Average: Preserve

Forecast for Kosovo - Delta Tool exercise



Stations

SubBars: M O:	EEA_AQI:	Cat5: Very Poor: 110.0--5000.0	Strt/end Ind: 1-8/60
		Cat4: Poor: 55.0--110.0	Model (s): CALPUFF
		Cat3: Medium: 30.0--55.0	Parameter: PM25
		Cat2: Good: 15.0--30.0	Scen: 2022
		Cat1: Very Good: 0.0--15.0	Extra Values: No
			Season: Year
			Day hours: All 24h
			Time Average: Preserve
			Daily stats: Mean



Stations

SubBars: M O:	EEA_AQI:	Cat5: Very Poor: 240.0--5000.0	Strt/end Ind: 1-8/60
		Cat4: Poor: 180.0--240.0	Model (s): CAMS
		Cat3: Medium: 120.0--180.0	Parameter: O3
		Cat2: Good: 60.0--120.0	Scen: 2022
		Cat1: Very Good: 0.0--60.0	Extra Values: No
			Season: Year
			Day hours: All 24h
			Time Average: 8h
			Daily stats: Max

CONCLUSIONS

- How to answer to the question: **Are citizens warned against high pollution episodes?**
- GSS using AQI (>moderate or poor AQI level) - is a simple indicator which may be used. However, there is no threshold established
- Indicators use in the project based on hourly AQI:
How to connect number of AQI level with timing in DeltaTool?



Thank you for your attention

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