

# Evaluation of MQO for Portugal

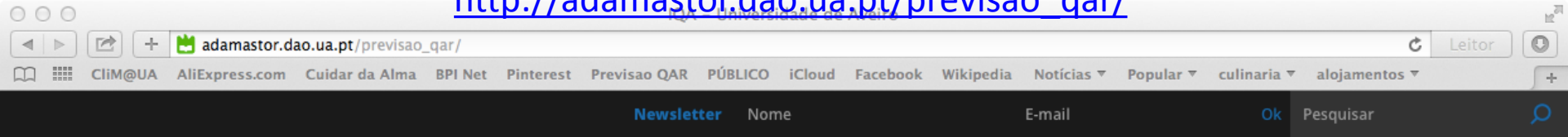
## WG1 | CCA Forecast

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Ana Isabel Miranda



# Our air quality forecast web page

[http://adamastor.dao.ua.pt/previsao\\_qar/](http://adamastor.dao.ua.pt/previsao_qar/)



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## Previsão do Índice de Qualidade do Ar para Portugal Continental

Hoje, 24.06.2015

Amanhã, 25.06.2015

- Muito Bom
- Bom
- Médio
- Fraco
- Mau



# Our application

Data selection

Model & Scenario selection	
Scenario	Model
2013	EURAD

Type	Parameter selection
POL	NO2
	O3
	PM10
	PM25

Run

EURAD(2013)

Region	Station Type	Area Type	Siting
All	<input checked="" type="radio"/> All	<input checked="" type="radio"/> All	<input checked="" type="radio"/> All
Almada	<input type="radio"/> background	<input type="radio"/> rural	<input type="radio"/> plane
Braga	<input type="radio"/> industrial	<input type="radio"/> suburban	
Casteloes		<input type="radio"/> urban	
Chamusca			
Coimbra			
Fundao			
Ilhavo			
Leiria			
Lisboa			
Loures			
Lousada			

Available stations	Selected stations
ARC	ARC
CHA	CHA
COI	COI
ERV	ERV
FRN	FRN
FUN	FUN
HRT	HRT
ILH	ILH
LAR	LAR
LNH	LNH
LOU	LOU
MEC	MEC
MFM	MFM

MOD without OBS

Single mode  Group mode

Add

Remove

S#: 22

G:

Load Obs Save Obs

OK

# Our application



Analysis

**Elaboration**

**Diagram**

- BarPlot
- Scatter
- Time Series
- Target (OU)**
- Summary Report & print (OU)
- MPC (OU)
- Taylor
- Q\_Q plot

**Statistics**

- 8H Max (03)
- Daily (PM...)
- Forecast**
- Hourly (NO2...)

Target diagram for forecast. First threshold parameter is the limit value, the second is the observation uncertainty in percent (e.g. from 1 to 100)

Need thresholds (v1#v2...)    120.0000; 50.0000; 2

Display criteria...

**Multiple choice info**

Max multiple choice for selected diagram is: 2

For selected statistic you may select (3):

- 1)models.
- 2)observations.
- 3)models, observations.

**Data**

**Time Avg**

- preserve (none)
- 8h running
- N/A

**Daily stats**

- Preserve
- Mean
- Max
- Min
- N/A

Hour    Day    Month

Date    0    1    1

          23    31    12

**Season**

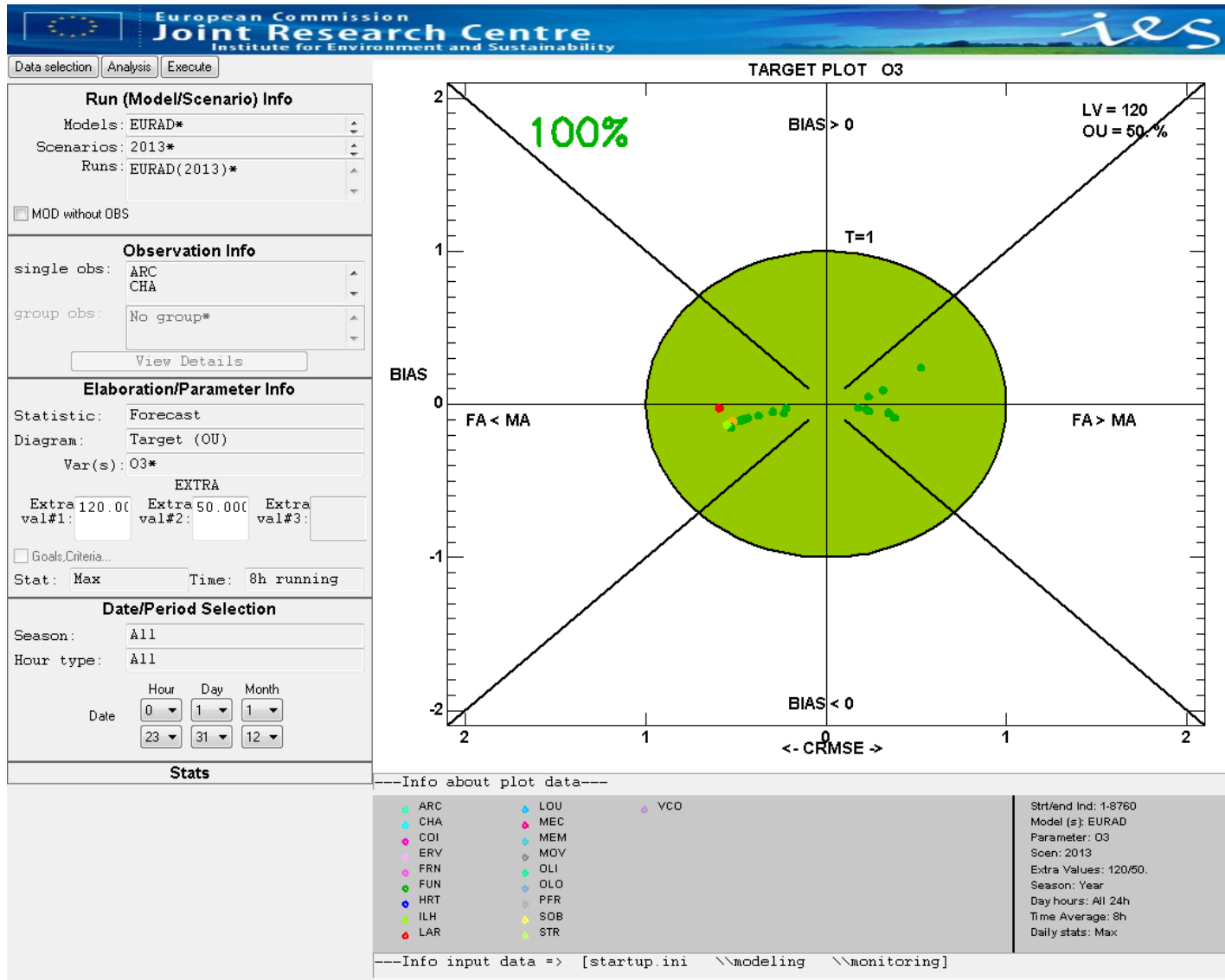
- All
- Summer (JJA)
- Winter (DJF)
- N/A

**Day**

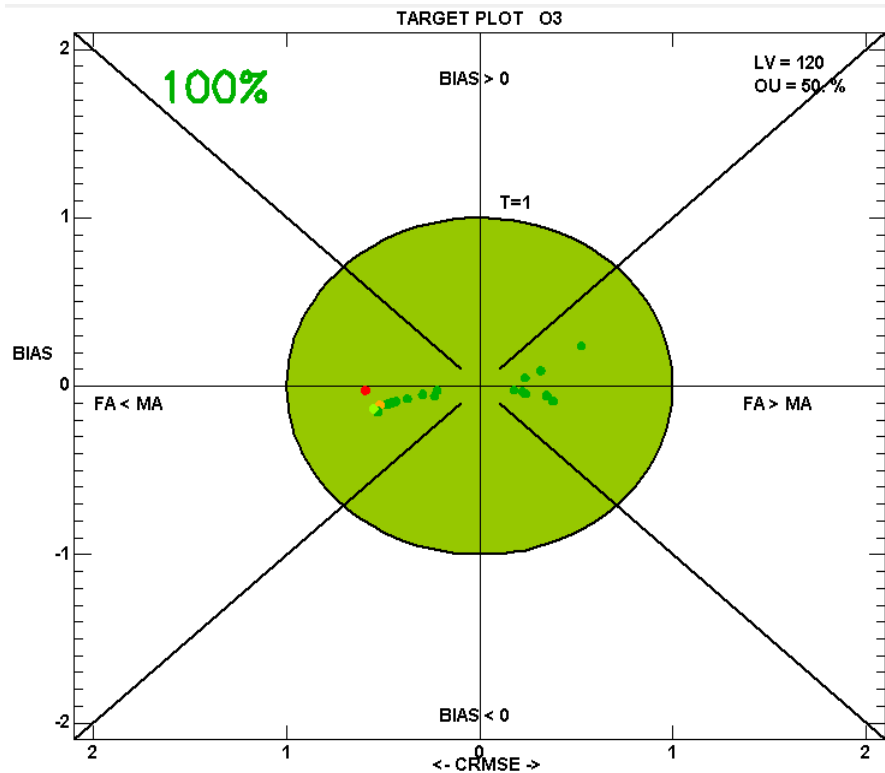
- All
- Day (08-19)
- Night (00-07/20-23)
- WeekDays (Mo-Fri)
- WeekEnd (Sa-Su)
- N/A

OK

# Our application



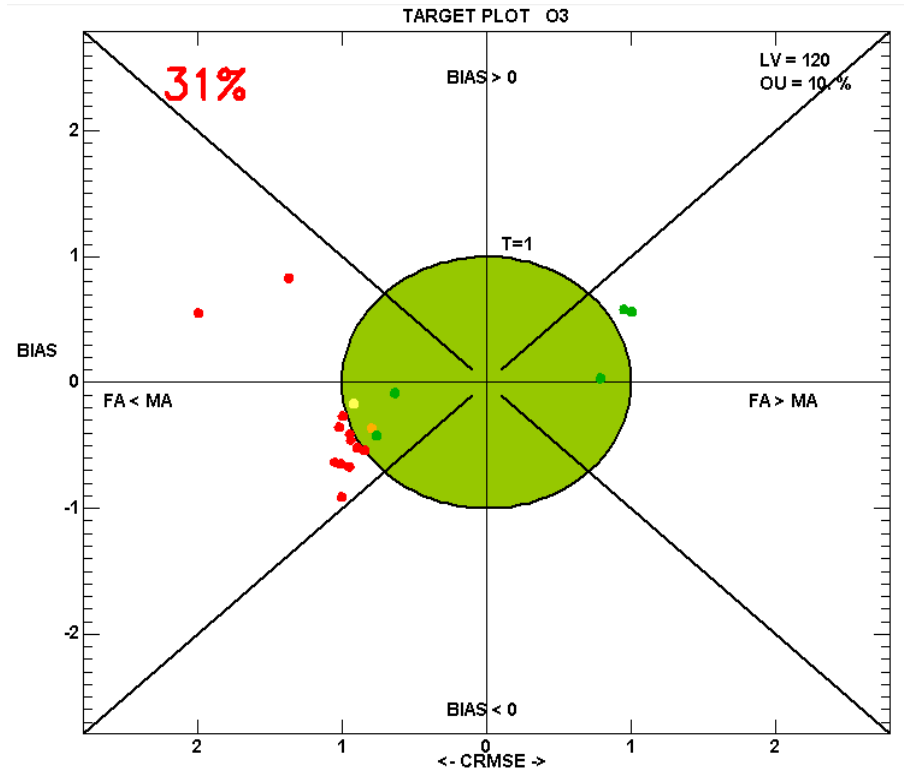
# The importance of OU



---Info about plot data---

ARC	LOU	VCO	Strt/end Ind: 1-8760 Model (s): EURAD Parameter: O3 Scen: 2013 Extra Values: 120/50. Season: Year Day hours: All 24h Time Average: 8h Daily stats: Max
CHA	MEC		
COI	MEM		
ERY	MOV		
FRN	OLI		
FUN	OLO		
HRT	PFR		
ILH	SOB		
LAR	STR		

---Info input data => [startup.ini \modeling \monitoring]



---Info about plot data---

ARC	LOU	VCO	Strt/end Ind: 1-8760 Model (s): EURAD Parameter: O3 Scen: 2013 Extra Values: 120/10. Season: Year Day hours: All 24h Time Average: 8h Daily stats: Max
CHA	MEC		
COI	MEM		
ERY	MOV		
FRN	OLI		
FUN	OLO		
HRT	PFR		
ILH	SOB		
LAR	STR		

---Info input data => [startup.ini \modeling \monitoring]

# The Indicators

1) Jenny/Amy & Bino suggested to replace the ratio FA/MA along the x-axis by a new indicator combining the probability of good detection of threshold ( $FCF = GA+ / (GA++ + MA)$ ) and the rate of false alarm ( $FFA = FA / (GA++ + FA)$ ). 2 formulas are proposed:



- $FCF - FFA$  (if  $> 0$  means  $FA > MA$  and if  $< 0$   $MA > FA$ ) ➡ **Maybe more easy to interpret**
- $FCF + FFA - 1$  (if  $> 0$  means  $FA > MA$  and if  $< 0$   $MA > FA$ )

2) For the color of the point, another possibility would be to use the values calculated from  $GA+ / (GA++ + MA + FA)$  instead of  $GA+ / (MA + FA)$  **Yes, we agree!**

3) After the preliminary test stage, we notice that the increase of the threshold value leads to better performances due to the fact that higher the threshold is lower is the dataset above the threshold. To address this, the selection of station has been revised to **take into account in the evaluation process only the stations with at least one value above the threshold either in the observations or forecast.**

**And if there is no values above the threshold?  
The forecast is still valuable...**

# The Summary Report

Analysis X

### Elaboration

#### Diagram

- BarPlot
- Scatter
- Time Series
- Target (OU)
- Summary Report & print (OU)**
- MPC (OU)
- Taylor
- Q\_Q plot

#### Statistics

- Daily - Year (PM10)
- 8H Max (O3)**
- Hourly - Year (NO2...)

summary report: The threshold value is the limit value.

Need thresholds (v1#v2...)    120#    1

Display criteria...

#### Multiple choice info

Max multiple choice for selected diagram is: 1

For selected statistic you may select (1):  
1) observations.

### Data

#### Time Avg

preserve (none)

8h running

N/A

#### Daily stats

Preserve

Mean

Max

Min

N/A

Date	Hour	Day	Month
	0	1	1
	23	31	12

#### Season

All

Summer (JJA)

Winter (DJF)

N/A

#### Day

All

Day (08-19)

Night (00-07/20-23)

WeekDays (Mo-Fr)

WeekEnd (Sa-Su)

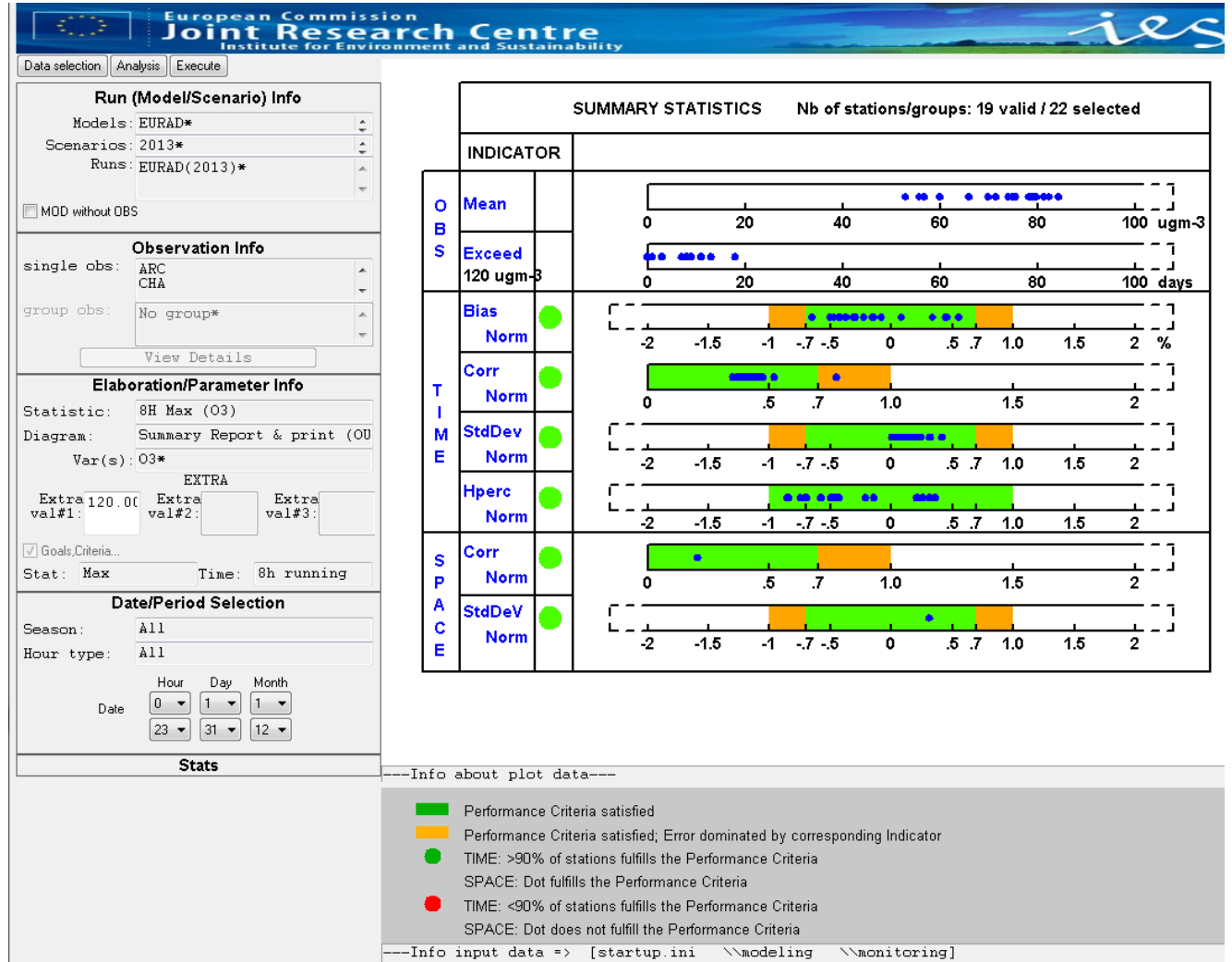
N/A

OK



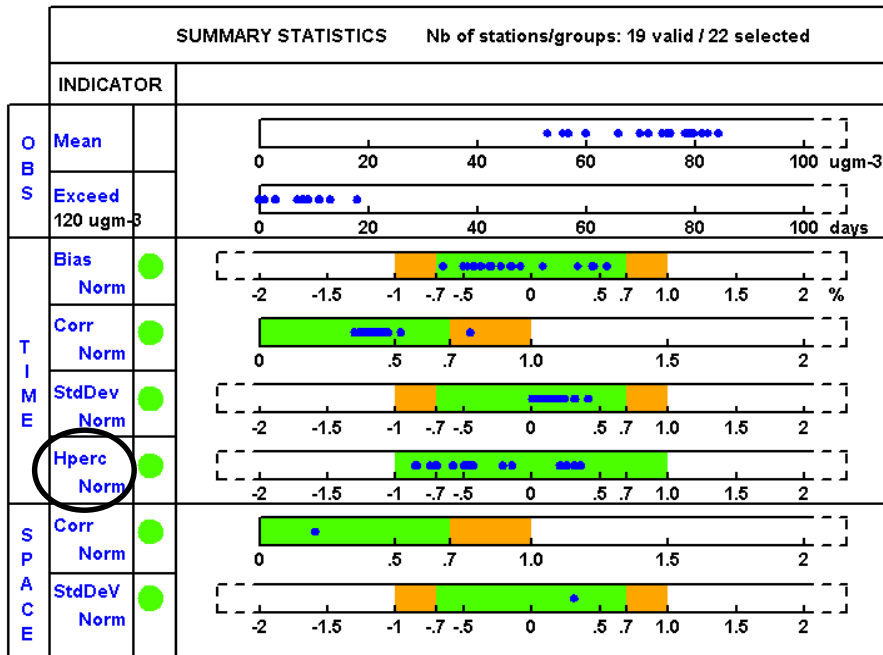
# The Summary Report

There is **no forecast indicators** in this summary report

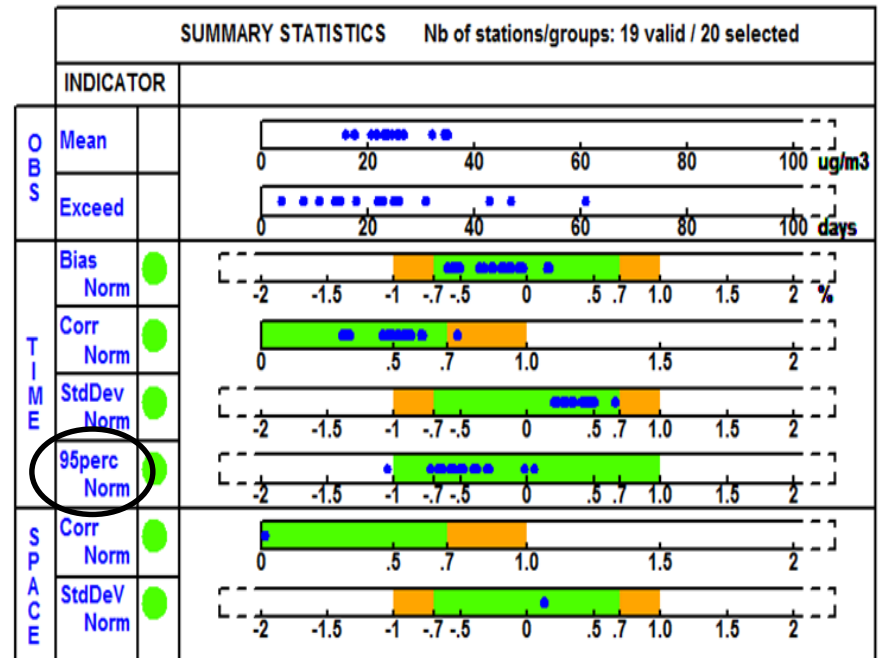


# The Summary Report

## Our summary report



## Summary report Guidance 22/01/2015



# What kind of statistics would be interesting to implement in the summary report?

[http://adamastor.dao.ua.pt/previsao\\_qar](http://adamastor.dao.ua.pt/previsao_qar)

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desempenho, tal como o número de IQA previsto/observado por classe, obtido para as estações de qualidade do ar em estudo (21 no total), para o O3 e para as PM10, para o período em avaliação Outubro 2013-Setembro 2014.

**Índice Observado**

Índice Previsto	Índice Observado					Total	Parâmetro	%
	Red	Orange	Yellow	Green	Light Green			
Red	0	0	0	0	0	0	Concordância índices	68
Orange	0	0	0	2	0	2	Probabilidade de deteção dos IQA fraco e mau	100
Yellow	0	0	116	146	17	279		
Green	0	0	1007	39943	17276	58226		
Light Green	0	0	307	27734	56964	85005	Falso alarme para os IQA fraco e mau	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>1430</b>	<b>67825</b>	<b>74257</b>	<b>143512</b>		

**Índice Observado**

Índice Previsto	Índice Observado					Total	Parâmetro	%
	Red	Orange	Yellow	Green	Light Green			
Red	0	0	1	0	0	1	Concordância índices	66
Orange	0	10	39	83	35	167	Probabilidade de deteção dos IQA fraco e mau	100
Yellow	1	12	87	199	180	479		
Green	0	22	102	696	790	1610		
Light Green	2	26	105	570	3418	4121	Falso alarme para os IQA fraco e mau	0
<b>Total</b>	<b>3</b>	<b>70</b>	<b>334</b>	<b>1548</b>	<b>4423</b>	<b>6378</b>		

Index agreement ??

GA+



FA

Tabela 1. IQA previsto/monitorizado e indicadores de desempenho, para as estações de qualidade do ar em estudo, para o O3, para o período Outubro 2013-Setembro 2014.

Tabela 2. IQA previsto/monitorizado e indicadores de desempenho, para as estações de qualidade do ar em estudo, para as PM10, para o período Outubro 2013-Setembro 2014.

In the future we plan to replace this information by the DELTA Tool Summary Report!

# Next test stage

- Evaluation of the MACC forecast  **Important and can be used as reference**
- Update of the forecast target diagram document  **Useful & important**
- Some guidance on OU (when there is no information)
- Including forecast indicators on summary report
- Paper preparation!?! (for future references)