

#### Status of EPS verification modules development Results after the first testing period

Angela Celozzi Chiara Marsigli







#### VERSUS EPS- PP PLAN Phase 5

#### Task 3: Implementation of Probabilistic Scores

This task is ongoing from the COSMO year 2012 - task4 phase 4. During this year, the PL team will finish the calculation and visualisation of the ensemble and probabilistic scores in VERSUS using as a reference the EPS documents edited by F.Gofa (Task 5.a phase 3). and A. Boundel (Pre-task phase 4).

In the Patch08 (release scheduled for December 2012),VERSUS will be able to calculate the Following Statistical Indexes:

- ✓ Brier Score and its decomposition
- ✓ Brier Skill Score
- ✓ Ranked Probability Score and Skill Score

And of the following plots:

- ✓ Rank Histogram
- ✓ ROC Curve (and ROC area)
- Reliability Diagram (with Sharpness Histogram)
- ✓ Cost/Loss Ratio

in the Standard Verification for continuous parameters and precipitation.







- Now after the loader of EPS grib and bufr, the system organizes the data, calculates the Probability and calculates the statistical index using R software.
- It was necessary to update R software with the last version available. This is the reason of the introduction of the Task 1.a Only with the last R version we can use the code suggested from Anastasia in her document. Unfortunately the new R code doesn't compatible with the old one and some changes are necessary in the R scripts
- ✓ A particularly extensive test phase is necessary because the R behaviour, during the multi-user sessions, isn't clear.
- ✓ VERSUS allows the execution of the EPS score only for the precipitation as cumulated parameter. For any other cumulated parameter is necessary to extend the VERSUS system.







Decisions have to be made regarding the possibility to implement them also for the WDV, Conditional Verification, for the Verification with the Analysis fields, and for the upper air verification from WG.

The deterministic approach was implemented in the past also for Ensable models.









## **EPS:** Registration

Configuration         Description         Pratical Mare         Oracle       Worthly         Observation       Wertfleation         Observation       Wertfleation         Observation       Registration         Observation       Registration         Observation       Registration         Observation       Registration         Observation       Registration         Remoter 1       Member 1         Member 3       Member 1         Member 4       Member 3         Member 5       Report         Report       Scores and Diagrams are fixed		Standard (EPS)		
Description       EPS monthly (MECE)         Stratification       Practica di Mare         Observation       Monthly         Stage       Standard         Observation       Practica di Mare         Pracentedri       Precipitation - KG/M**2 - 13021         Parameter       Precipitation - mm - 2         Member 3       Member 4         Member 4       Member 3         Member 5       Standard         Member 6       Member 7 type         Observation       Pracentedri         Precipitation - mm - 2       Immediation         Member 7       Member 3         Member 8       Member 4         Member 9       Member 7         Member 1       Member 1         Member 3       Immediation         Member 4       Member 7         Member 5       Immediation         Member 6       Immediation         Member 7       Immediation         Member 8       Immediation         Member 9       Immediation         Member 1       Immediation         Member 3       Immediation         Member 4       Immediation         Member 5       Immemodiation         N		Registration	Configuration	It' possible to
Stratification       Pratica di Mare       Image: Construction         Observation       Standard         Observation       Peccipitation - KG/M**2 - 13021       Image: Construction         Parameter       Peccipitation - mm - 2       Image: Construction         Members 3       Image: Construction       Report         Member 4       Image: Construction       Report         Members 3       Image: Construction       Report         Members 4       Image: Construction       Report         Members 5       Image: Construction       Report         Members 4       Image: Construction       Report         Members 5       Image: Construction       Report         Members 6       Image: Construction       Report         Members 6       Image: Construction       Report         Members 7       Image: Construction       Report         Members 6       Image: Construction       Report         Image: Constructice R=15 km (mean_radius param-Image: Construction	Description	EPS monthly (MECE)		
Date       Monthly       Image: Conditional Standard Conditional Weather Type Conditional Weather Type Costs         Standard Cost - Standard Cost - Standard Conditional Weather Type Costs       Conditional Weather Type Costs         Forecast       Cost - Cost	Stratification	Pratica di Mare		for the verification
Start 24 End 120 Interval 24       Start 24 End 120 Interval 24         Observation       Precedentian         Parameter       PRECIPITATION - KG/M**2 - 13021         Forecast       Scatter Plot         Kodel       COSMO-LEPS-131-80-2         Wember 3       Wember 4         Member 4       Member 3         Member 5       Immediation         Member 6       Member 4         Member 7       Immediation         Member 8       Immediation         Member 9       Immediation         Member 1       Immediation         Member 2       Immediation         Member 3       Immediation         Member 4       Immediation         Member 5       Immediation         Method       06) Maan of points Circle R-15 km (mean_radius param.= Immediation         Titis 10       Immediation         I(20, 23)       Immediation         I(20, 23)       Immediation         I(20, 23) </td <td>Date Frequency</td> <td>Monthly</td> <td>Verification</td> <td></td>	Date Frequency	Monthly	Verification	
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Delete     Add       Scores     BRIER, BRIER SKILL, BRIER DECOMPOSTION, RPS, RPSS, RPS.clim       Diagrams     ROC, Reliability, Cost-Loss, Rank		[10, 20]     From:     To:       [20, 25]     *       [25, 9999]     *		are fixed
Scores     BRIER, BRIER SKILL, BRIER DECOMPOSTION, RPS, RPSS, RPS.dim       Diagrams     ROC, Reliability, Cost-Loss, Rank		Delete Add		
Diagrams ROC, Reliability, Cost-Loss, Rank	Scores	BRIER, BRIER SKILL, BRIER DECOMPOSTION, RPS, RPSS, RPS.dim		
	Diagrams	ROC, Reliability, Cost-Loss, Rank		







# EPS: Report

The ve To create a r	erification has been created. New verification click on 'Continue'	
Standa	ard Verification Report[EPS]	
Id	2695	
Name	EPS monthly (MECE)	
Criteria Type	Surface	
Dichotomic	No	
Run	0	
Frequency	Monthly	
Period Based	Forecast	
Steps	START: 24 END: 120 INTERVAL: 24	
Stratification	Pratica di Mare	
Geographical Distribution	No	
OBS		
Parameter	TOTAL PRECIPITATION - KG/M**2 - 13021	Dicorame: DOC Delighility
Suspect Value	No	Diagrams, ROC, Reliability,
FCS		CostLoss, Rank
Model	COSMO-LEPS	
Grid	Lat first:-16.125; Lon first:-15.75; Lat last:9.75; Lon last:16.125	
Parameter	Precipitation - mm - 2	
EPS Diagramm	ROC, Reliability, Cost-Loss, Rank	
Scores	BRIER BRIER-SD BRIER-SKILL RPS RPSS RPS.clim	Scores : BRIER, BRIER-SD, BRIER-SKILL, RPS, RPSS, RPS.clim
Thresholds	[0,1] [1,10] [10,20]	







#### EPS: Searching configured verification

Verification ID	(Active ID Criteria)			Configur
Description				1 1 2 2 2
Verification	Standard		Weather Type	1.200
	O Time Series	O Daily Cycle	O Scatter Plot	200
	COSI	O Cross	Monthly	Verific
	• Standard (EPS)			-111
Criteria	Surface			
				R
Date	Start 2012-04-01	Start 2012-04-01 Stop 2012-04-30		
Frequency	Monthly			Verification Ar
Model				Oi An Verification Rer
Run	Run 0			
Method				
OBS Parameter				
	Search	Reset		







#### **EPS:** Results of searching



Running a verification on EPS means to calculate the Probability of distribution, the scores and the graphs. Probabilities are carried out by means of php and saved as files that can be inspected after the execution. Scores and graphs are calculated by means of R package using verification

and ensembleBMA libraries.







#### **EPS:** Execution





- Get the scores value
- Get the probabilities value (new icon)
- Run graphics for numerical scores
- Download pdf graphs







ROC

From: 2012-04-01 To: 2012-04-30 Step: 24 Th: 1 -9999

#### Reliability

From: 2012-04-01 To: 2012-04-30 Step: 24 Th: 1 -9999









**Cost Loss** 

From: 2012-04-01 To: 2012-04-30 Step: 24 Th: 1 -9999



Verification Rank Histogram









By thresholds

By steps























## EPS Graphic: RPS/RPSS/RPS.clim









- Versus and ARPA
- Model: Cosmo-Leps 16 Members
- Parameter: Precipitation
- Thresholds: 1,10,20
- One station: Pratica di MARE
- One Month: April 2012













Remarkably similar pattern Differences in the first threshold









# Brier Skill Score

+120h



In the first threshold the difference is considerable. We need to investigate!!









# RPS: Difference in the first step.

RPSS: Similar pattern but systematic error



SMO

