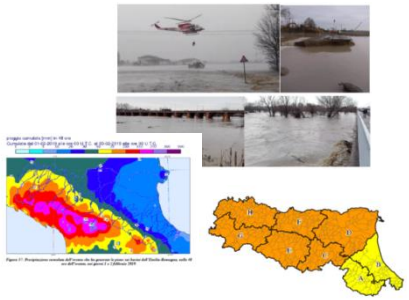
AWARE TASK 4.3: QPF evaluation approaches



- In this task we describe the products provided hydrologists or forecaster to evaluate the amount of precipitation over catchment areas:
  - QPF estimation over catchment areas is of fundamental importance for hydrological purpose to issue Civil Protection alerts for possible floods
  - To meet end-users the needs we have developed some tools that provide mean, maximum and some other percentiles values of the precipitation field over the catchment areas of the Emilia-Romagna region.
  - Exceeding predefined thresholds can give useful indications for situations of intense precipitation possibly leading to floods.

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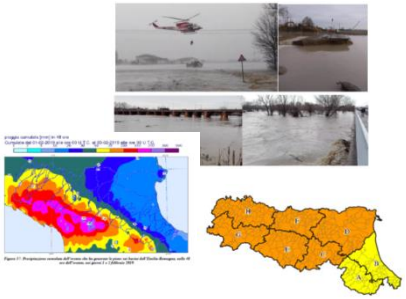
AWARE TASK 4.3:
QPF evaluation approaches



- In this task we describe the products provided hydrologists or forecaster to evaluate the amount of precipitation over catchment areas:
- Work done:
  - ✓ **On a daily basis, summary tables with estimated mean and maximum precipitation over each catchment areas of the Emilia-Romagna region are produced for several deterministic model with different resolutions (COSMO-5M, COSMO-2I or IFS-ECMWF).**

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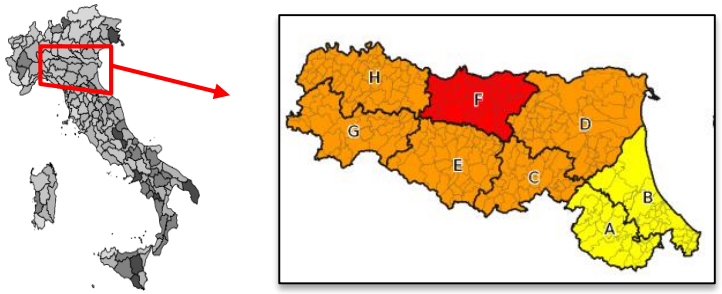
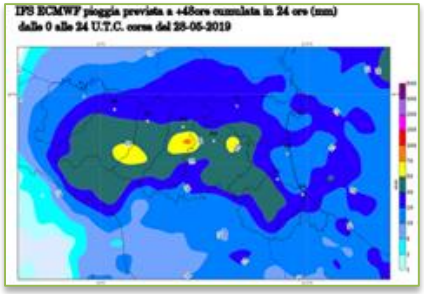
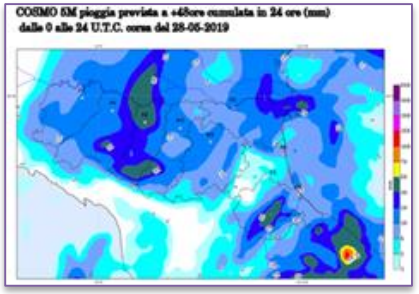
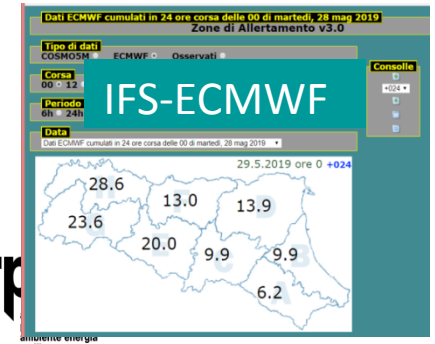
Operational tools to estimate QPF

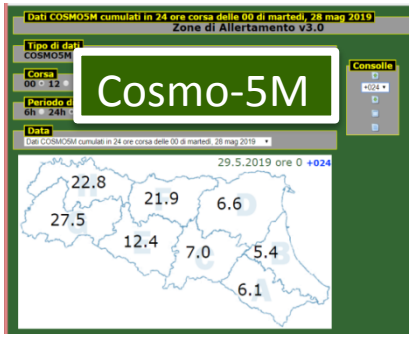
- On a daily basis, summary tables with estimated mean and maximum precipitation over each catchment areas of the Emilia-Romagna region are produced for several deterministic model with different resolutions (COSMO-5M, COSMO-2I or IFS-ECMWF) by means of LIBSIM software











- For each area the return period (or recurrence interval) is reported: exceeding predefined thresholds can give useful indications for situations of intense precipitation possibly leading to floods.

Area	2yh6	2yh12	2yh24	2yh48	2yh72	5yh6	5yh12	5yh24	5yh48	5yh72	10yh6	10yh12	10yh24	10yh48	10yh72	20yh6	20yh12	20yh24	20yh48	20yh72
A	35	46	62	84	100	46	63	84	115	137	54	73	98	131	156	62	83	113	150	178
B	33	43	56	75	88	43	59	77	103	121	51	68	90	118	139	59	78	103	136	159
C	35	48	66	91	109	46	66	90	123	149	54	76	105	141	170	62	86	120	161	193
D	29	38	49	64	74	39	52	67	87	101	45	60	78	99	115	52	68	89	114	132
E	40	55	76	110	135	52	72	100	144	176	60	84	115	166	204	68	95	130	188	230
F	30	38	50	65	76	40	52	67	87	102	47	61	79	103	120	54	70	91	118	138
G	47	64	88	128	157	62	85	115	169	207	72	98	134	197	241	82	112	153	224	275
H	35	45	59	79	93	46	61	79	106	125	55	72	93	125	147	63	83	107	144	170

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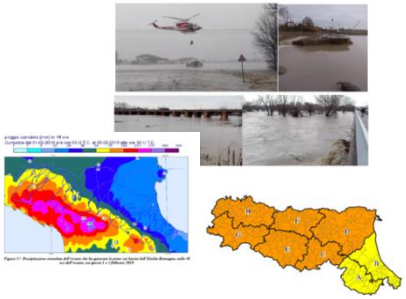

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- Work done:
  - ✓ On a daily basis, summary tables with estimated mean and maximum precipitation over each catchment areas of the Emilia-Romagna region are produced for several deterministic model with different resolutions (COSMO-5M, COSMO-2I or IFS-ECMWF).
  - ✓ **Using the COSMO-LEPS system, we also evaluate the probability of exceeding selected thresholds as average precipitation over the selected catchment areas.**

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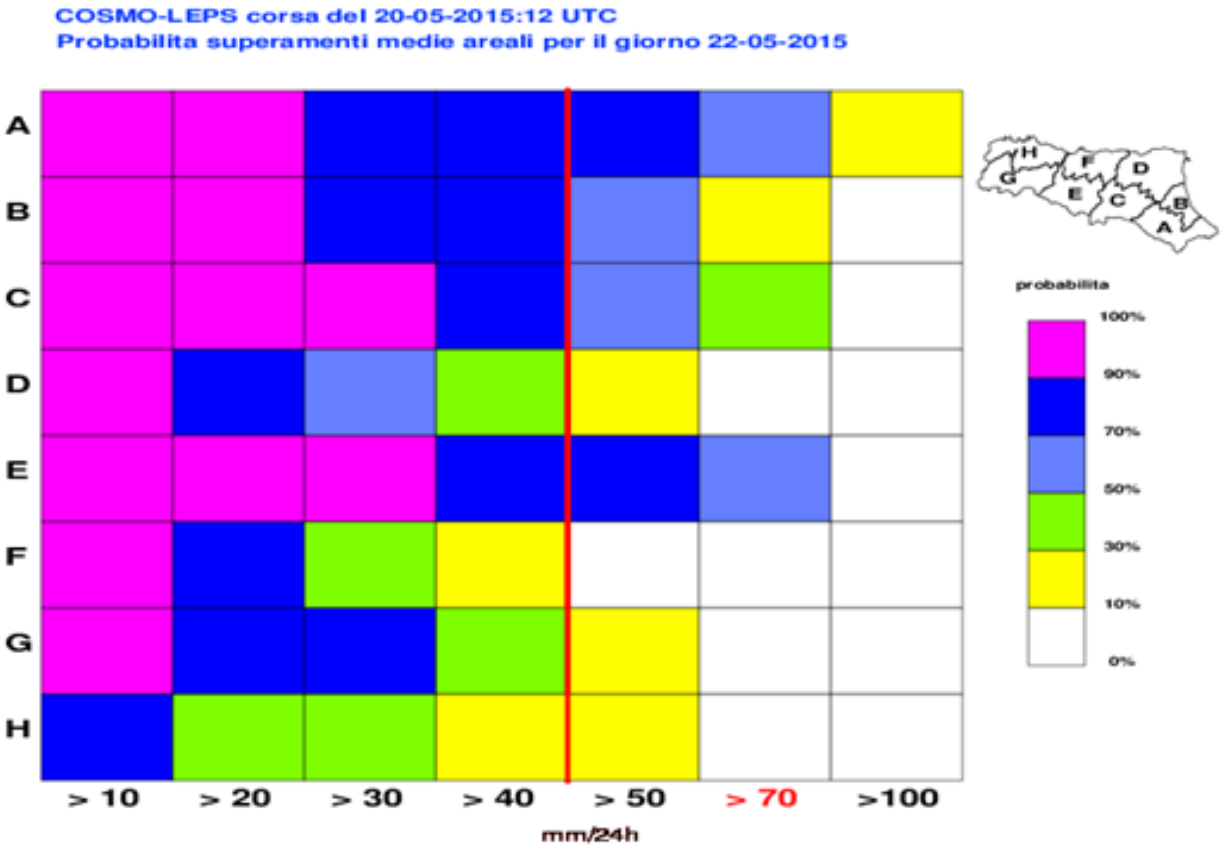
Operational tools to estimate QPF

- Using the **COSMO-LEPS** system we also evaluate the probability of exceeding selected thresholds as average precipitation over the selected catchment areas.
- We don't use thresholds on probability to issue alert, but it help the forecaster to assess confidence in one modeling chain or the other



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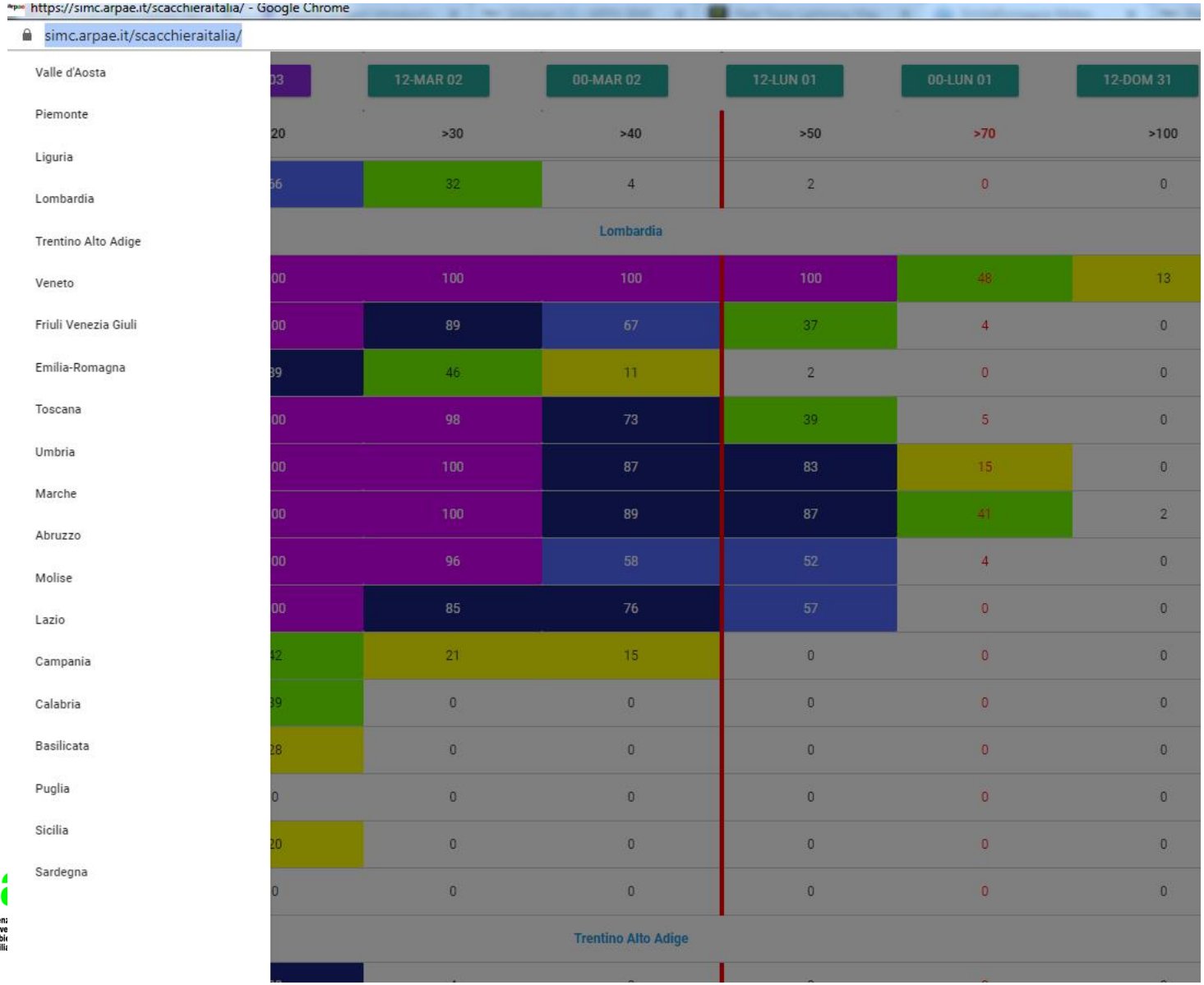
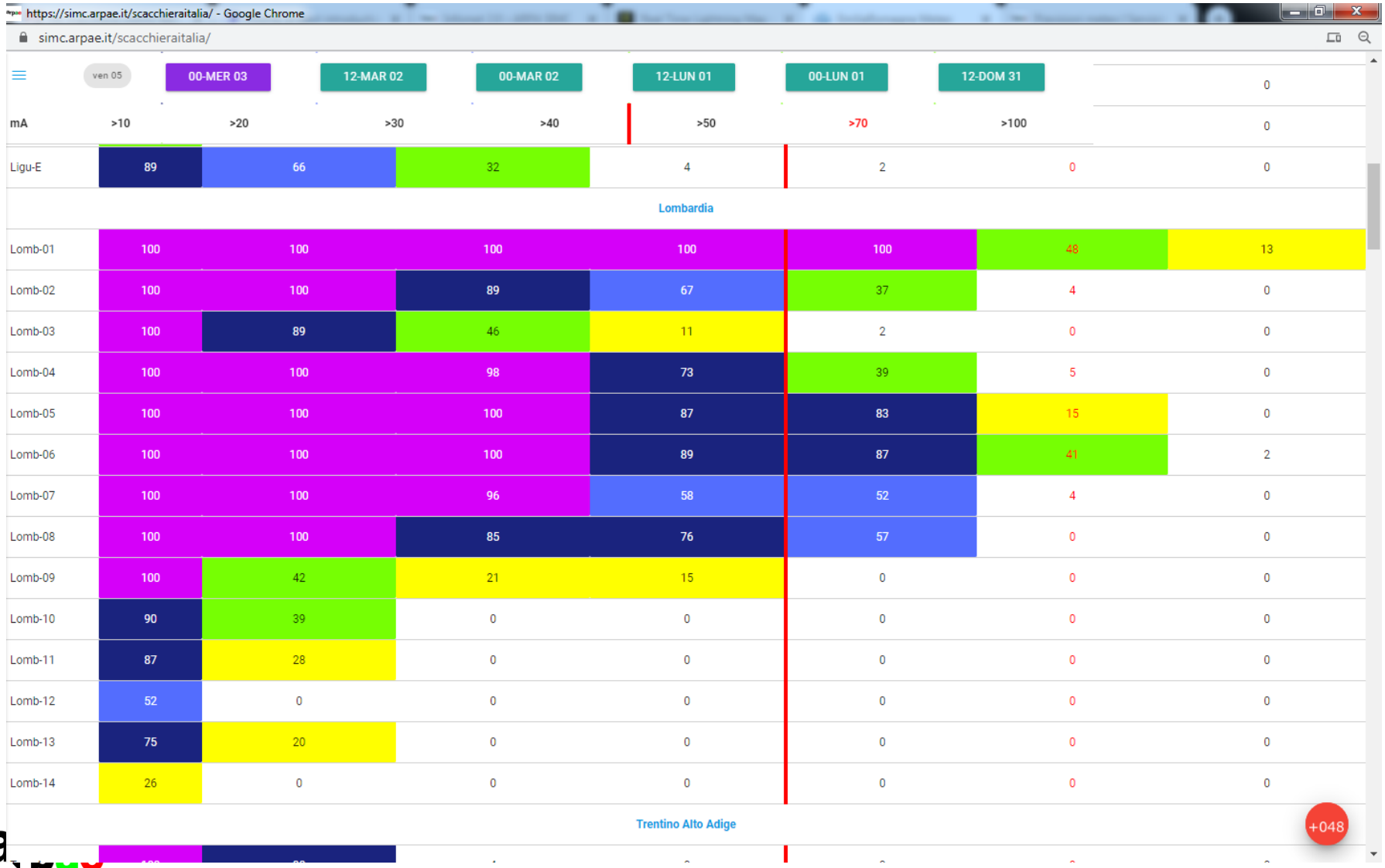
Operational tools to estimate QPF



Operational tools to estimate QPF



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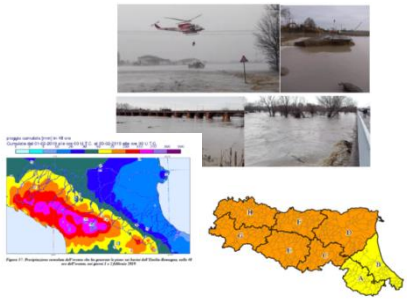
QPF evaluation approaches



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  - ✓ **Deterministic products are validate on a seasonal basis using a bubble chart in which forecast mean or max of precipitation is compared with respective observed precipitation over each catchment area.**

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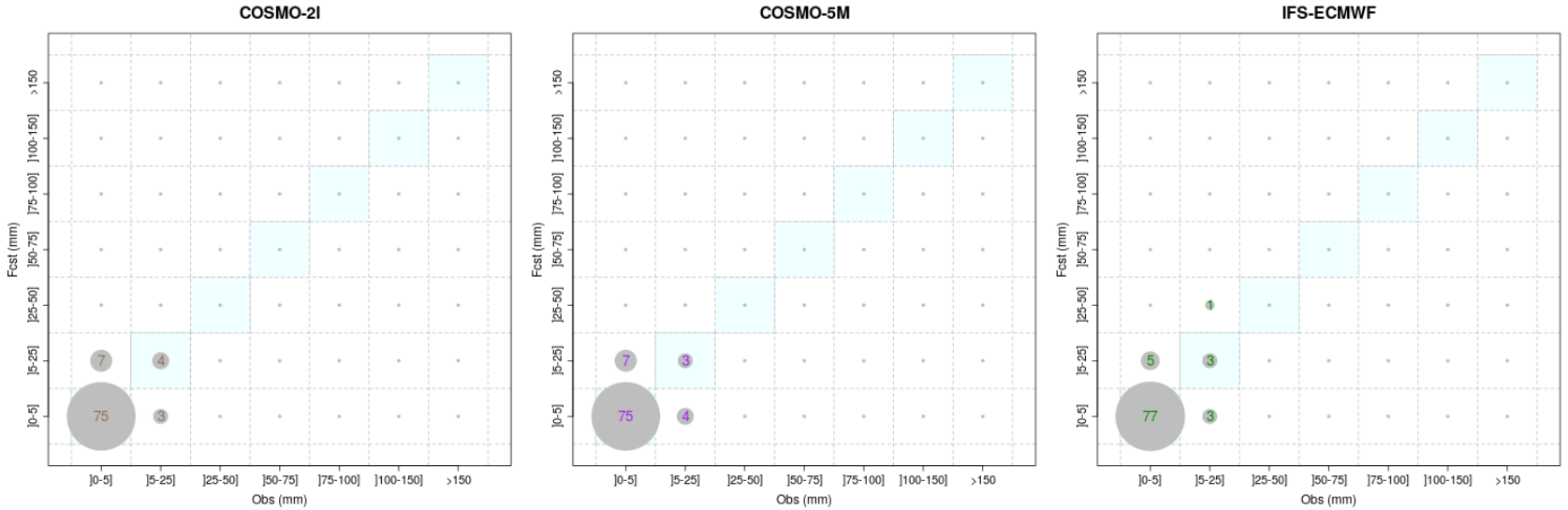
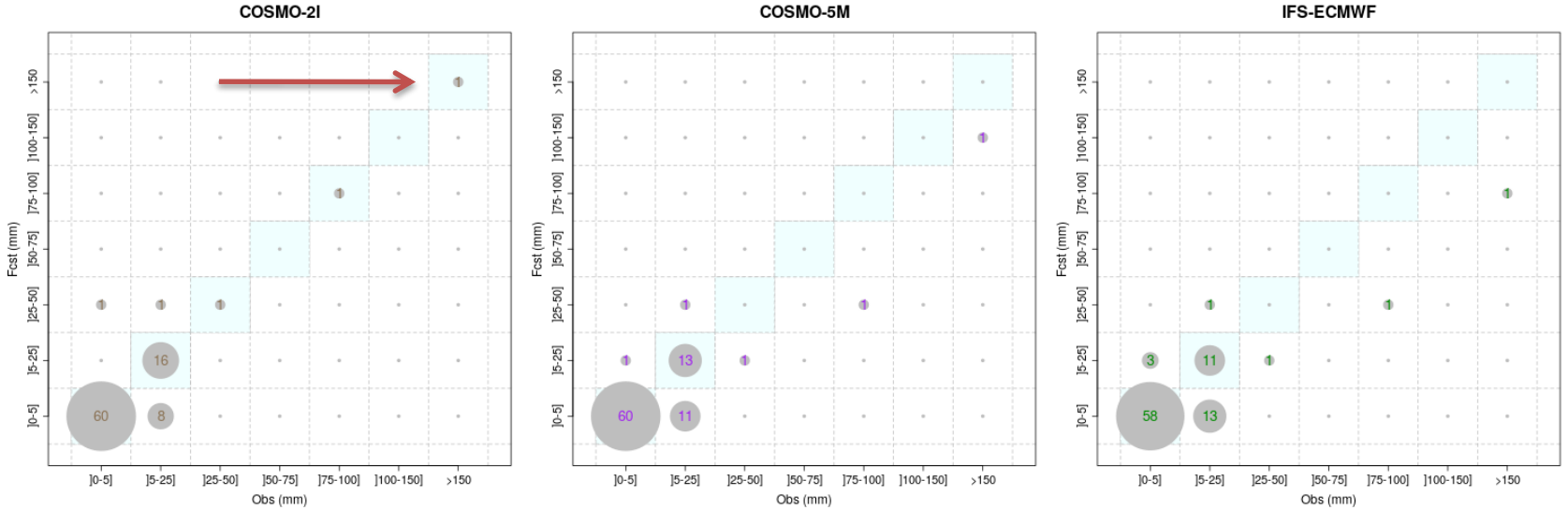
Example of validation of QPF over single area

DJF2018-19

MEAN



MAX



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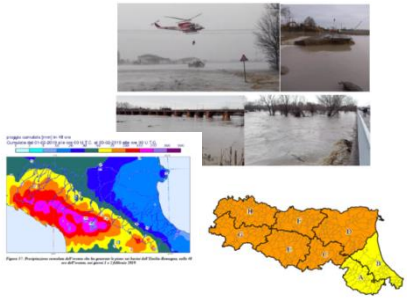
QPF evaluation approaches



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  - ✓ Using the COSMO-LEPS system, we also evaluate the probability of exceeding selected thresholds as average precipitation over the selected catchment areas.
  - ✓ Deterministic products are validate on a seasonal basis using a bubble chart in which forecast mean or max of precipitation is compared with respective observed precipitation over each catchment area.
- **To be done:**
  - ❑ Write the document with an overview of all the products provided to the end-user (forecaster or hydrologist)
  - ❑ Produce short report with the work accomplished

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