PRODUCT NAME: **PR-OBS-5 v1.2 (H05, 6-hours accumulation period)**		
CASE STUDY PERIOD: 13 Jun 2012 from 12 to 21 UTC	METEOROLOGICAL EVENT:	
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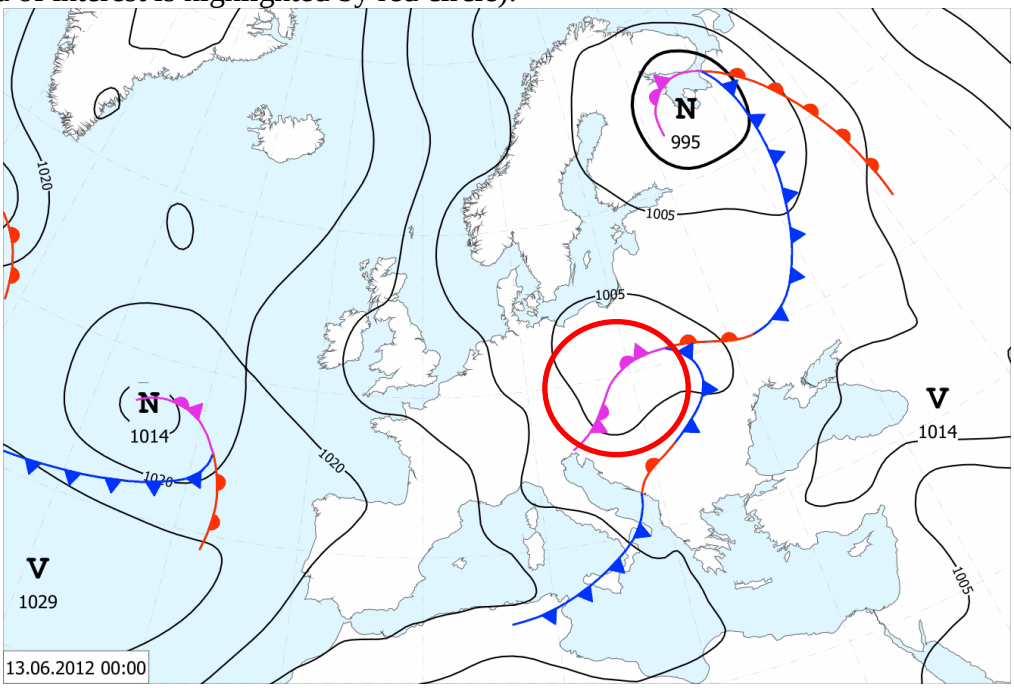
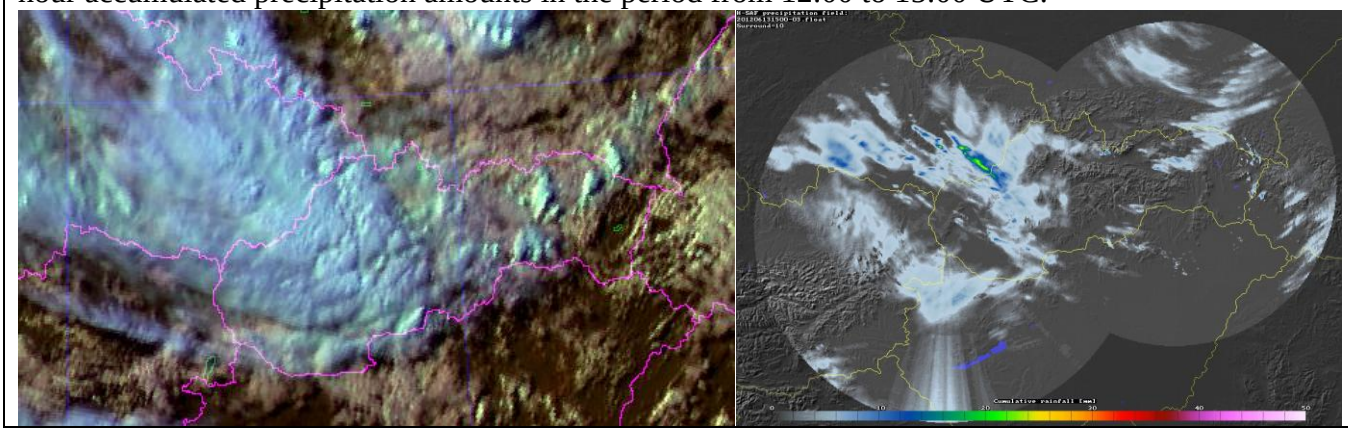
METEOROLOGICAL EVENT DESCRIPTION

Lower pressure area with occlusion induced strong convection and precipitation over west and central part of Slovakia. Areas of scattered lower precipitation amounts were deteced also in eastern part of country (area of interest is highlighted by red circle):



MSG HRV&IR RGB (left) shows development of convection during the afternoon period (15:00 UTC), when precipitation was formed and radar image (right) shows distribution of corresponding 3-hour accumulated precipitation amounts in the period from 12:00 to 15:00 UTC:



DATA/PRODUCTS USED

From top to the bottom:

6-hour accumulated precipitation field from Slovak radar network in full resolution (top panel)

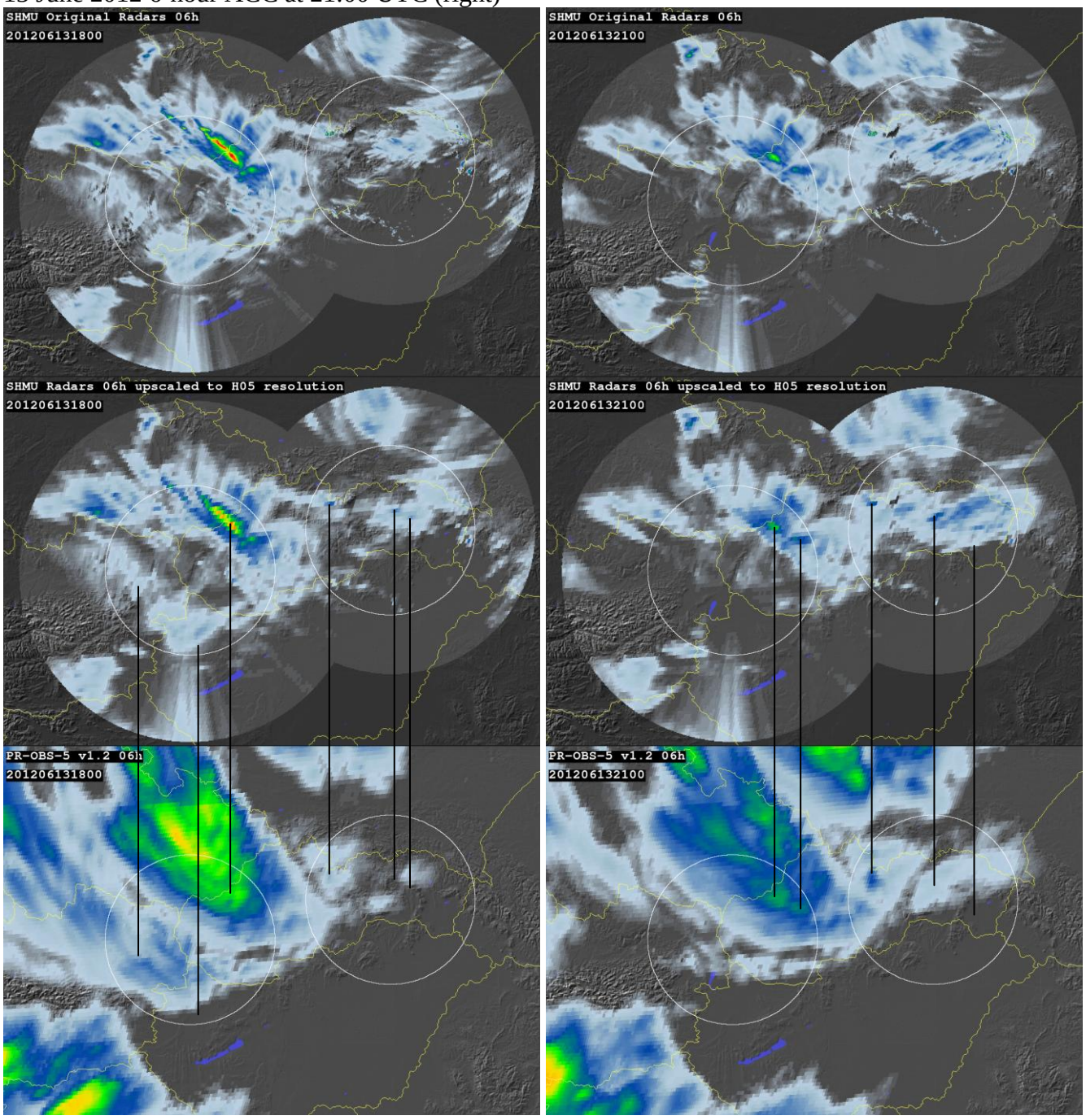
6-hour accumulated precipitation field from Slovak radar network upscaled to H05 resolution (middle panel)

6-hour accumulated precipitation field from H05 product (bottom panel)

From left to the right:

13 June 2012 6-hour ACC at 18:00 UTC (left)

13 June 2012 6-hour ACC at 21:00 UTC (right)



Common colour scale is used for both radar and satellite rain rates. In general, observed precipitation amounts during this weather situation were higher at 18:00 UTC in comparison to 21:00 UTC time slot. The aim of this case study is to evaluate spatial distribution of precipitation, maximum detected values and spatial matching of precipitation fields in radar and satellite products.

RESULTS OF COMPARISON

Vertical lines over the images indicate corresponding regions how the precipitation was detected by radar and by H05 product. We will describe this regions case by case along the black lines ends from the left (case a) to the right (case b):

a) Time slot 12-18 UTC:
   Line 1: Precipitation amount is overestimated in this region by H05 product.
   Line 2: South-eastern edge of precipitation filed is shifted to the north in H05 product.
   Line 3: Strong precipitation in this region is underestimated by H05 product.
   Line 4: Medium precipitation is well localised but maximum is underestimated by H05 product.
   Line 5: Precipitation area is not properly detected by H05 product.
   Line 6: Southern part of this precipitation field was not detected by H05 product.

b) Time slot 15-21 UTC:
   Line 7: Precipitation amount in this region was well estimated and localised by H05 product.
   Line 8: Precipitation field was well localised but slightly overestimated by H05 product.
   Line 9: Medium precipitation amount was estimated properly by H05 product but size of area is slightly overestimated to the south.
   Line 10: Precipitation in this region is underestimated by H05 product.
   Line 11: South edge of precipitation field is shifted to the north by H05 product.

Results of statistical processing of radar and satellite data are shown in following tables.

Table 1 Selected scores of continuous statistics

Precipitation class (mm)	1-8	8 - 32	32 - 64	≥ 1
Mean error (mm)	2.74	1.17	-	2.64
Multiplicative bias	1.96	1.10	-	1.76
Correlation coefficient	0.20	0.43	-	0.37
URD-RMSE (%)	325%	57%	-	314%

Table 2 Selected scores of dichotomous statistics

Precipitation threshold (mm)	≥ 1	≥ 8
POD	0.750	0.744
FAR	0.476	0.902
CSI	0.446	0.093

Probability of detection is in general about 75% for both evaluated precipitation classes but false alarms are higher when precipitation amount is higher. This fact is evident also from CSI values, which are too low for precipitation amounts higher than 8 mm.
Mean error is lower and reasonable for higher but quite big for low precipitation amounts. This result corresponds also to distribution of relative RMSE, but overall relative RMSE is too high (314%). Correlation is positive and better in case of higher precipitation amounts (0.43 for class 8-32mm).

COMMENTS

Using higher resolution of radar measurements (original radar) we properly observe higher local precipitation maxima. It is important to note that radar precipitation field is underestimated close to the end of radar range but these areas were excluded from statistical evaluation process (areas outside of white circles in the images).

INDICATION TO DEVELOPERS

Some precipitation fields with lower amounts are horizontally shifted to the north in H05 product.
Areas with medium precipitation amounts are underestimated by H05 product. Maximum of heavy precipitation is also underestimated or not localised well while size of the areas with heavy precipitation is strongly overestimated by H05 product.