

<b>Product Name</b>	<b>H10 – SN-OBS-01</b>	<b>Validation Institute</b>	<b>IMWM</b>
<b>Case Study Period</b>	<b>26-01-2010</b>	<b>Case Study Geographical Area</b>	<b>Poland</b>

**METEOREOLOGICAL EVENT DESCRIPTION**

Day 26.01.2010 was chosen for detailed analysis because this day snow was measured on every ground station in Poland. Additionally there were almost no clouds and stable snow cover over Poland. Temperature was very low (*figure below*)

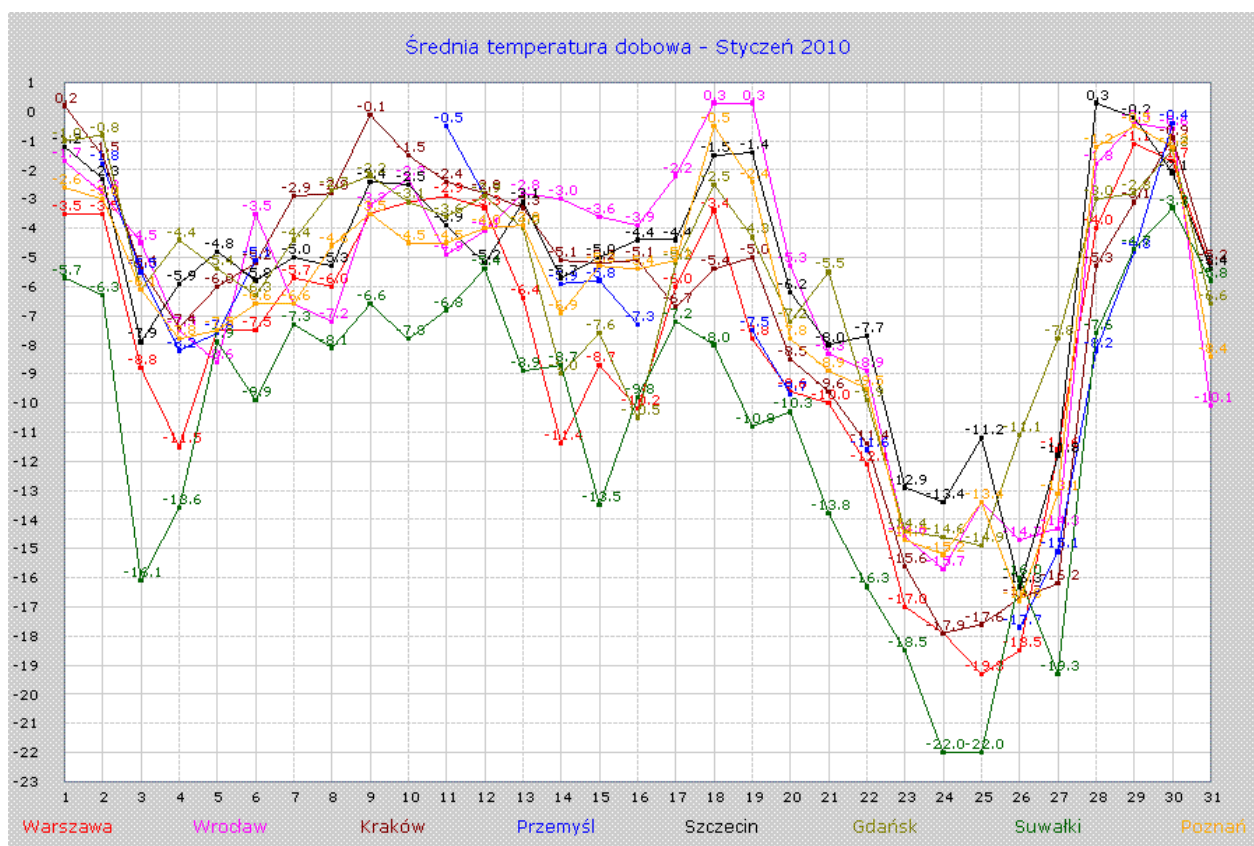


Figure: Mean daily temperature (Y-axis) for January (X-axis) 2010 for eight cities over Poland

**DATA/PRODUCTS USED**

Reference data: data from Polish SYNOP network and lower level posts – System of Hydrology database (SH).

Ancillary data: NWC SAF Cloud Type (CT) product, METEOSAT-9 RGB ch.139i

**RESULT OF COMPARISON**

For visual verification comparison with other satellite products (different projection!) have been made (**Fig. 39**). Snow area in Poland was detected properly on H10 products. Also good agreement of classification of cloudy areas – low clouds in northern Poland and thin high clouds on the east, clearly visible on RGB composition and CT product - were observed.

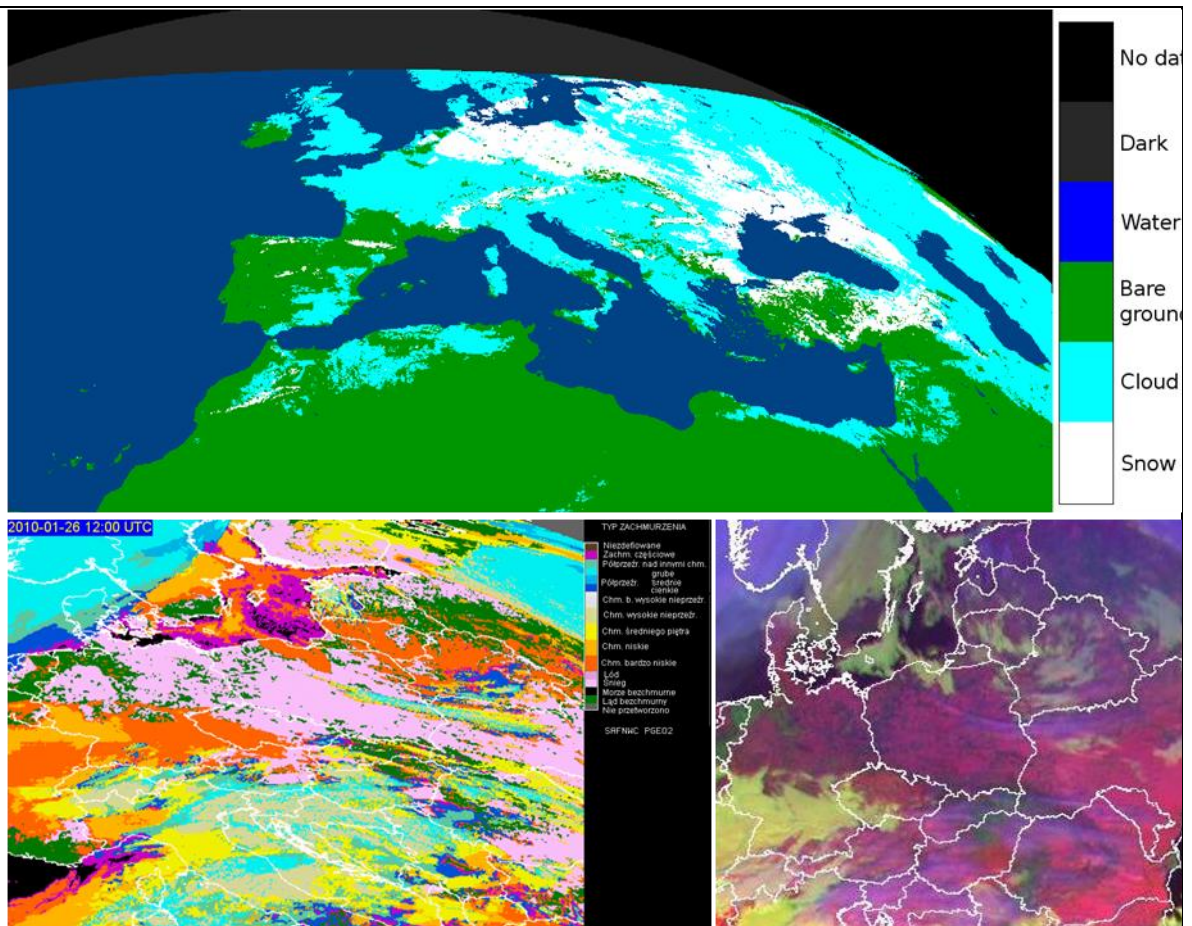


Figure 1 H10 Visual verification. Case study 26.01.2010. Top - H-SAF H10 daily product; bottom left - NWC SAF Cloud Type product 12.00 UTC (snow – pink, middle level clouds – yellow, semitransparent clouds – pale green/cyan/purple, ground - green); bottom right – METEOSAT-9 RGB ch.139i 12.00 UTC (snow - red, high clouds/ice – pink/violet, low clouds – yellow, ground - green)

### Scores evaluated

Quantitative verification results were presented in contingency tables and by calculated indices (Table below)

H10 26.01.2010	merged SD>=2	flat S.D>=2	mountain SD>=2
hits	225	198	27
false_alarm	2	0	2
misses	51	24	27
correct_neg	0	0	0
total	278.00	222.00	56.00
accuracy	0.81	0.89	0.48
bias	0.82	0.89	0.54
POD	0.82	0.89	0.50
FAR	0.01	0.00	0.07
POFD	1.00	-1.#J	1.00
CSI	0.81	0.89	0.48

**Table 1 H10- Contingency tables and statistics for H10 merged product divided into flat area and mountain area according to Mountain Mask. 26.01.2010**

Total number of comparison in analyzed day amounted 278: 222 for flat and 56 for mountain area according to Mountain Mask. For merged products both categorical statistics, accuracy and CSI, reached 81 % and FAR was satisfying low: 1 %. Threshold for snow presence was agreed as SD (Snow depth)  $\geq 2$  cm. The best scores were for flat area with accuracy and CSI 89 %. For this area no false alarm and correct negatives was noticed (which was true). Number of misses was similar for flat and mountain area (24, 27 respectively) but for mountain number of hits was much lower. Thus for this area accuracy amounted to around 48 %.

Because this day snow depth was measured on every ground station in Poland, during point to pixel verification, H10 product should equal 0 - snow or 42 - cloud only, but it was not the case. In mid level area pixels were classified as ground (H10 - code 85) – that were misses in Contingency Table. The altitude of these pixels ranged from 375 m a.s.l (Glucholazy) till 815 m a.s.l (Zieleniec) with mean altitude 535 m a.s.l. Mean snow cover depth measured on the matched ground posts is equal 14 cm with maximum 53 cm and minimum 2 cm. Mean distance from the centre of pixel to the matched ground station amounted to 2 km with std dev 0.7. For flat area it seemed not important but in mountain region with big differences in elevation and land use on a small area it could cause problems. The reasons are not clear and need further detailed analysis.

#### **CONCLUSION**

In current report the same day - 26.01.2010 - was chosen for investigation, however with different threshold for snow cover existence (SD  $\geq 2$  cm). More graphs, detailed discussion and conclusions both for visual and quantitative verification are still generally valid and are included in the mentioned above report and its annexes.

To summarize: preliminary results of validation of h10 product (categorical statistics, visual validation) are promising but further improvements are highly required