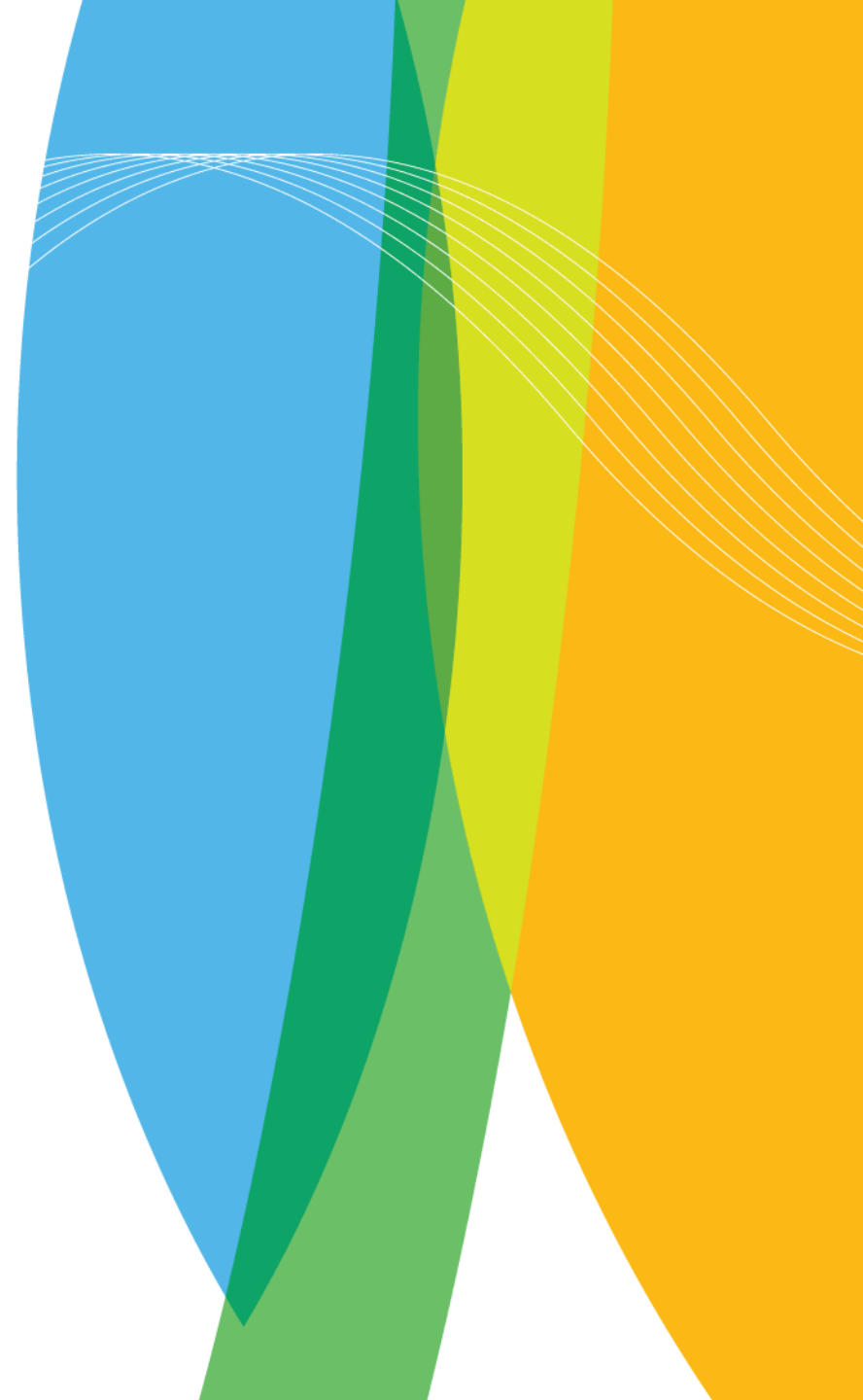




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H-SAF Snow Products

Matias Takala





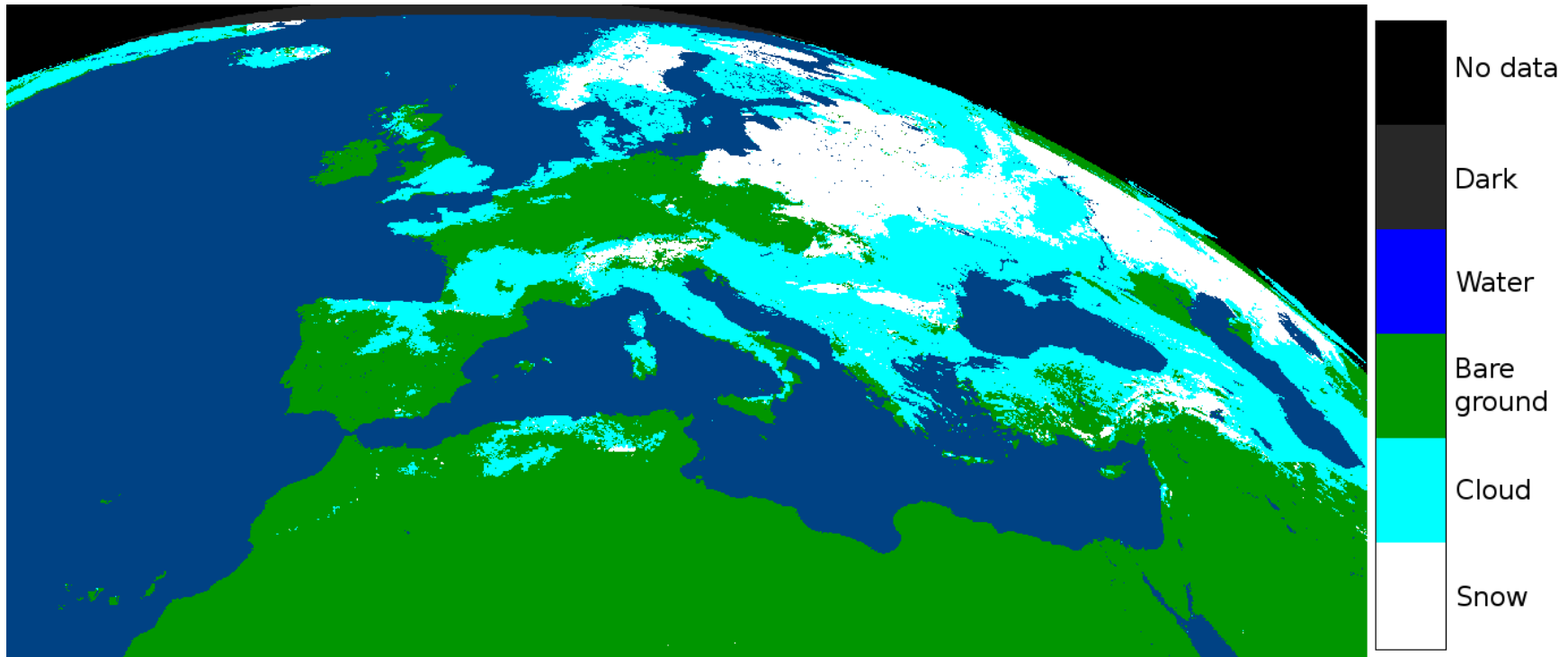
H-SAF snow products

- **H-SAF: EUMETSAT funded satellite application facility (SAF) for Support to Operational Hydrology and Water Management**
 - <http://hsaf.meteoam.it/> (pages still under development)
- **4 snow products:**
 - H-10: Snow/No snow
 - H-11: dry/wet snow
 - H-12: fractional snow cover (% covered by snow)
 - H-13: SWE (snow water equivalent)
 - Additional products modified from the above mentioned



H10 Snow / No Snow product

- Based on SEVIRI data
- Algorithm for flat lands developed within L-SAF
- Product is a merge of mountainous areas (Turkey) and flat lands (Finland)
- Product is **operational**
- Global daily MetOP/AVHRR SC product under development (25th Sept 2012)





H10 possible end uses

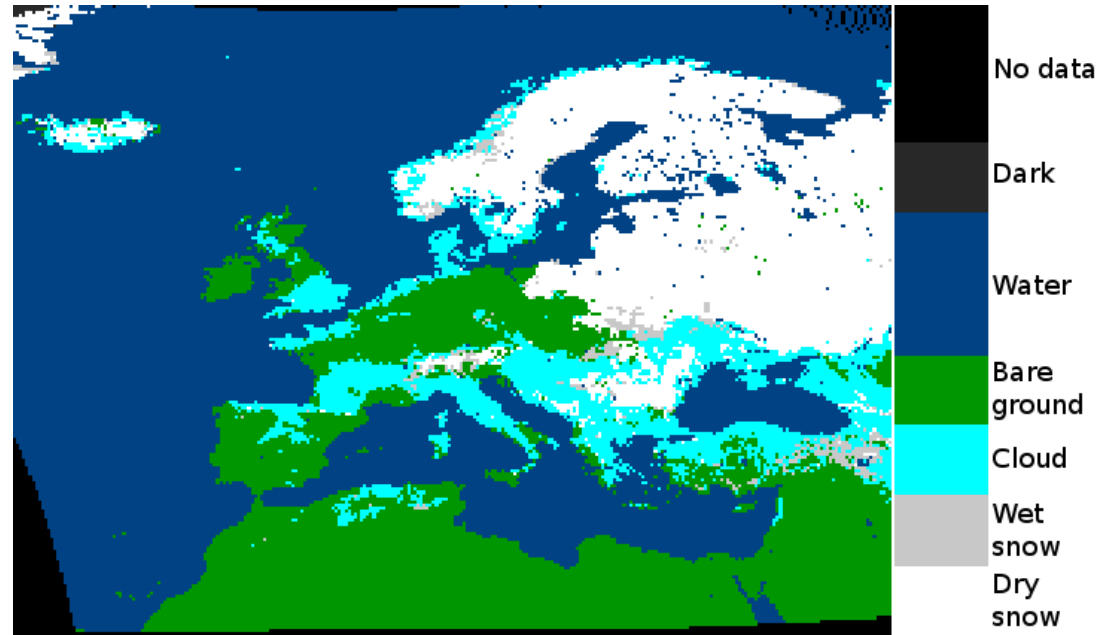
- As is; simple product to check where in Europe there is snow
- Input to other, more sophisticated snow products
- Input to weather models
- Input to climate models



H11 Snow status product

- Uses H10 as background data
- For areas covered with snow a radiometer interpretation is made for dry / wet snow differentiation
- Originally based on AMSR-E instrument but after its failure new baseline is SSMI/S instrument
- SSMI/S version is **pre-operational**

March 1, 2011





H11 possible end uses

- Quite similar product to H10
- As is; simple product to check where in Europe there is wet / dry snow
- Input to other, more sophisticated snow products
- Input to weather models
- Input to climate models

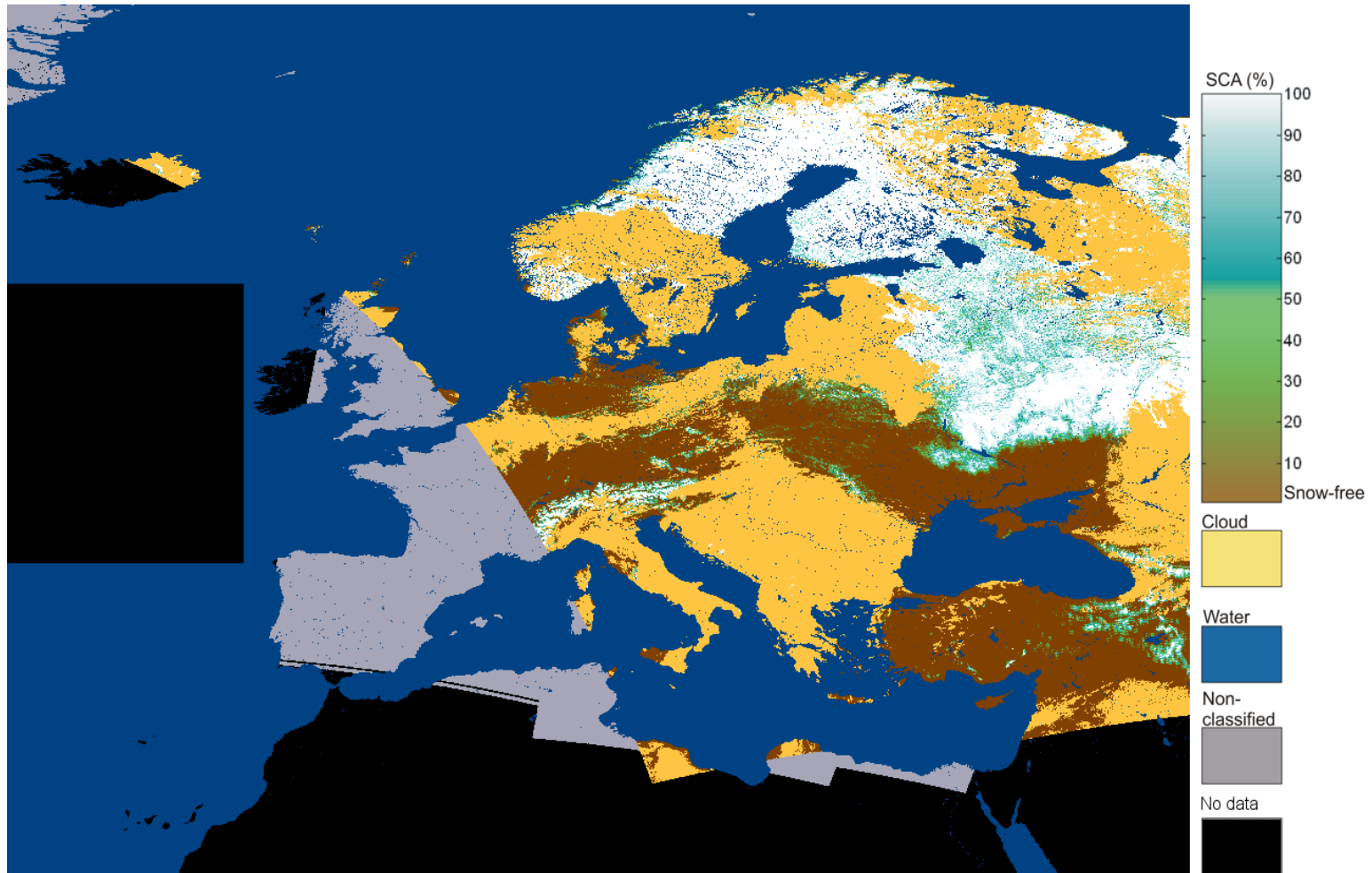


H12 Fractional Snow Cover product

- Product describes the percentage of Snow Covered Area (SCA) within product pixels (0-100%)
- Based on NOAA-18 and NOAA-19 data (spectrometer), possibility to use METOP data later on
- Uses Finnish Environment Institute SYKE Snow Covered Area-algorithm
- Forest transmissivity map derived by SYKE is used for flat lands
- Mountainous areas are produced by Turkey and flat areas by Finland. The H12 product is merged in FMI.
- Product is **pre-operational**



Example of SCA-product 23th March 2010





H12 possible end uses

- As is; H12 gives more detailed information of snow melt compared to H10
- Input to weather models
- Input to climate models
- Input to hydrological models (estimating onset of snow melt, river discharge)

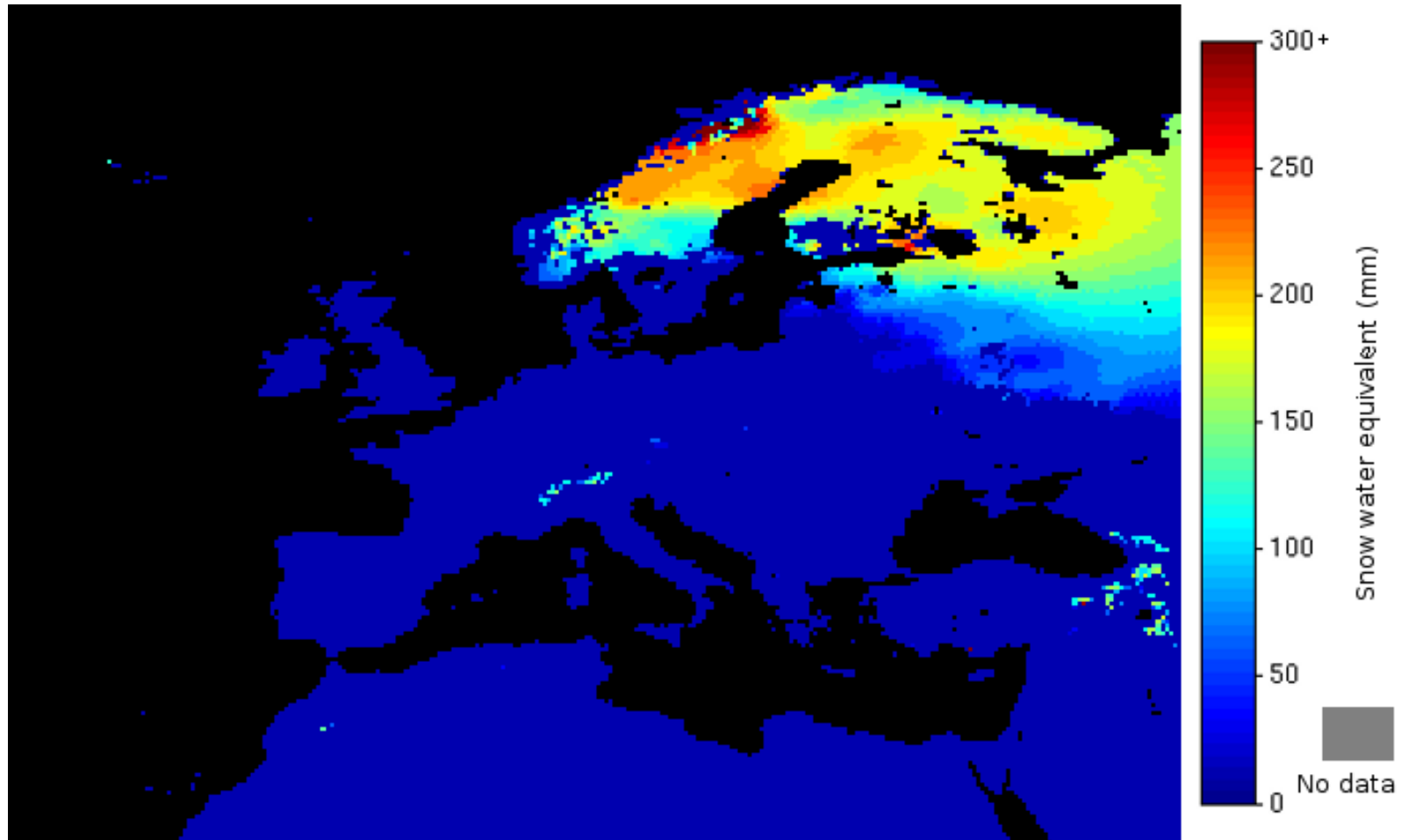


H13 Snow Water Equivalent Product

- Product describes Snow Water Equivalent (SWE) in mm
- SSMI/S based version is **operational**
- Mountainous areas are produced by Turkey and flat areas by Finland. The H13 product is merged.
- For mountainous areas SWE is derived using radiometer data only.
- For flat areas SWE is an assimilation of ground based snow depth observations and satellite data
- RMSE of H13 product for Finland ~ 35 mm (flat lands) and for Turkey (mountainous areas) ~ 45 mm



Example of H13 SWE product





H13 possible end uses

- As is; Information of snow extent, snow melt line, amount of snow
- Input to weather models
- Input to climate models
- Input to hydrological models (two most important parameters)
 - Onset of melt
 - Maximum amount of SWE



Additional snow products

- Different versions and development states of the previously mentioned products
- H31/32 Snow status product
 - Snow status products derived from L SAF
 - Only for flat lands
 - H31 snow status, MSG disk coverage with SEVIRI pixel resolution
 - H32 snow status, global coverage with AVHRR pixel resolution (Metop)
 - Products are operative
- H34/35/43 Snow status product
 - H34 second generation product, succeeding H31 and H10
 - H35 second generation product, succeeding H32 and H12
 - Products are in development
 - H43 Snow detection (snow mask) by VIS/NIR of MTG FCI
 - Product is in development



Data availability

- **All data and documentation is available for all interested free of charge**
- **More information from**
 - <http://hsaf.meteoam.it/>
 - The FMI H-SAF project team:
 - Matias Takala (project manager): matias.takala@fmi.fi
 - Niilo Siljamo: niilo.siljamo@fmi.fi
 - Panu Lahtinen: panu.lahtinen@fmi.fi
 - Kati Anttila: kati.anttila@fmi.fi