



# Day 2

## Summary of Day One

and

## Introduction to Day Two



Florian Appel VISTA



EUMETSAT

Workshop on European Satellite Snow Monitoring Perspectives  
4 - 5 December 2012



# Summary Day 1



- Introduction
- The European ESA and EUMETSAT long term evolution of snow services
- Science outlook – What can be expected in future for snow monitoring?
- Status and perspectives of existing European snow monitoring initiatives
- Discussion & White Paper Draft



# The European ESA and EUMETSAT long term evolution of snow services

- EUMETSAT SAFs (Lothar Schueller)
  - EUMETSAT SAF Network (8 distributed)
  - Providing Data and Software (not snow related)
  - “Operational” = continuity of products and quality (validation)
  - User interaction and involvement by EUMETCAST, data centers, workshops, helpdesk and: data is free of charge
  - Network history CDOP-1 / -2 / -3
  - Stable resources until 2022
  - Research to operation process, serving requirements of member states, development of new products
  - Proposals for CDOP-3 in 2015



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# The European ESA and EUMETSAT long term evolution of snow services

- ESA and Snow (Simon Pinnock)
  - ESA Satellites e.g. Sentinel 1 (Oct. 2013), Sent-2 and 3, PROBA V
  - CoreH2O as Earth Explorer candidate (1 of 3)
  - Application Development for Snow:  
DUE (Glob.. Series) / GMES (Polar View..) / CCI
  - Support for Science Element and scientific exploration of operational missions (SEOM)



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# The European ESA and EUMETSAT long term evolution of snow services

- GCW Global Cryosphere Watch (Barry Goodison, WMO)
  - authoritative, clear and useable data, information and analyses (past and future state of cryosphere)
  - Teams involved
  - CryoNet & Standardization
  - Snow Depth Data & GCW hemispheric snow monitoring
  - Bringing users and providers together GCW Web portal
  - Validation and the ongoing challenge
  - Improvements in scales (up scaling and down scaling)
- GEO / GEOSS (Yubao Qiu, GEO)
  - Goals and Gaps within coordination of satellite observations
  - GEO as a platform
  - Snow as part of the domain Water





# Science outlook – What can be expected in future for snow monitoring?

- Current Satellite data-aided research on snow cover (Jouni Pulliainen)

Summary of ESRIN “Earth Observation and Cryosphere Science Conference” (Nov 2012)

Technical scopes of ongoing science

CoreH2O X/Ku Band & Passive Microwave for SWE

Cal/Val & SWE and FSC (for Forest)

Snow grain size & SAR interferometrie

Black carbon on snow (albedo)

Results from studies

Trends of snow extent (NH)

in comparison to sea ice extent

in comparison to climate models



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# Status and perspectives of existing European snow monitoring initiatives

## Presentations:

- ESA GlobSnow (Kari Luojus, FMI)
- EUMETSAT H-SAF (Jouni Pulliainen, FMI)
- ESA Polar View (Florian Appel, VISTA)
- EC/GMES CryoLand (Thomas Nagler, ENVEO)

Fact Sheets available



# Discussion & White Paper Draft

- First Discussion & White Paper Seed Questions
  - Validation
  - Intercomparisons
    - e.g. super-sites / test-areas / catchments
    - Better description of products
  - Need of regional products
  - Solutions for sustainability to be found
  - Core Questions to Users



# European Snow Initiatives Synthesis Table

Available products for EUROPE	<b>H-SAF</b> - 2022	<b>GlobSnow</b> - 2014	<b>Polar View</b> - 2013	<b>CryoLand</b> - 2015
Data Archive		From 1979 / 1995	From 2002 / 2005 / 2007	From 2000 / 2012
<i>Snow Covered Area (binary)</i>	<b>H10, SN-OBS-1</b> 5km <b>H31, SN-OBS-0G</b> LSAF 5km <i>H32, SN-OBS-0P*</i> <i>H34, SN-OBS-1G*</i>	<b>FSC "ECV"</b> Northern Hemisphere 1km (daily / weekly / monthly)	<b>SCA</b> 1km Central Europe  <b>FSC</b> 1 km / 250 m Scandinavia 5 km / 1 km Baltic Area	<b>FSC</b> 250 m Scandinavia 1 km Baltic Area
<i>Fractional Snow Cover</i>	<b>H12, SN-OBS-3</b> 1km <i>H35, SN-OBS-1P*</i>		<b>FSC "10day"</b> 5 km	<b>FSC**</b> 500m
<i>Snow Status (wet/melting)</i>	<b>H11, SN-OBS-2</b> 5km		<b>Wet Snow</b> 1km Central Europe	<b>Wet Snow</b> 100m Alps + Norway
<i>Snow Water Equivalent</i> <i>Different approaches</i>	<b>H13, SN-OBS-4,</b> 25km	<b>SWE "ECV"</b> Northern Hemisphere 25 km	<b>SWE</b> 1 km Central Europe	<b>SWE</b> 10 km

\*Future / under development

\*\*pre-operational

+ additional downstream products and experimental products



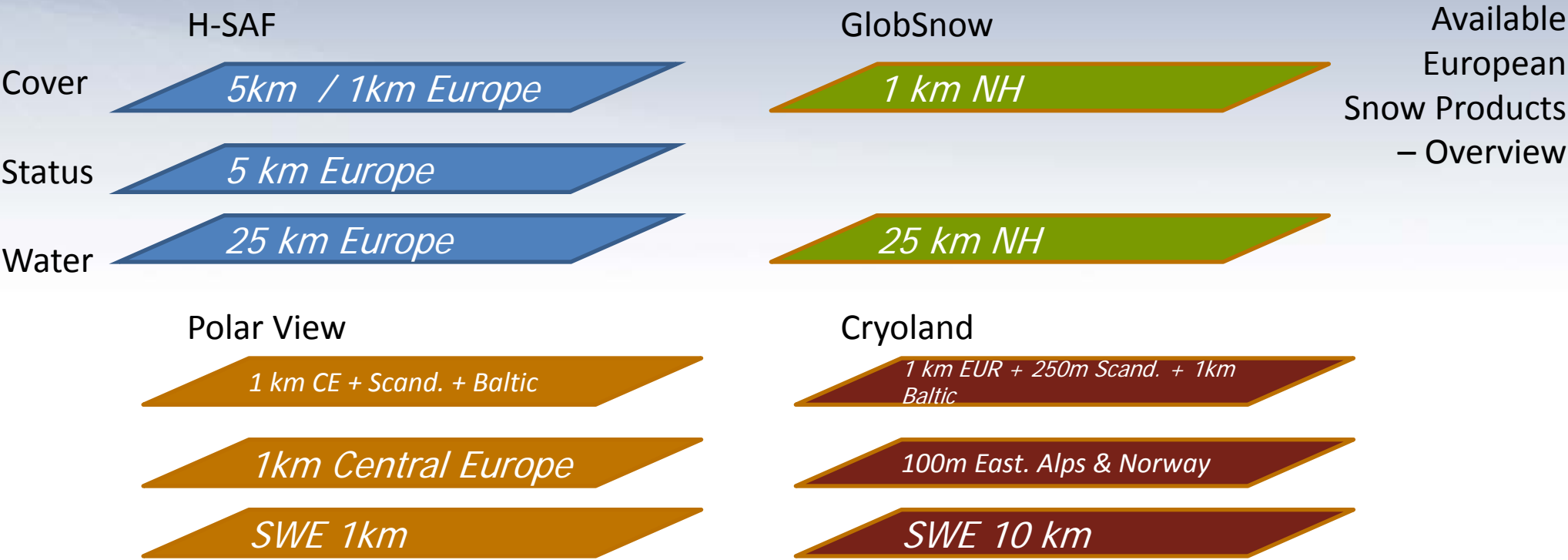
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# Status and perspectives of existing European snow monitoring initiatives

## Summary Day 1



NH: Northern Hemisphere, CE = Central Europe

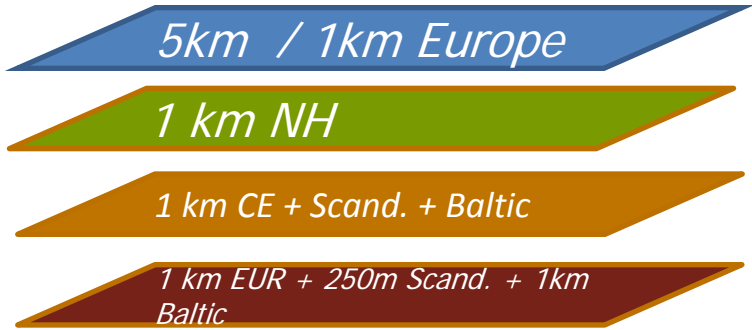
Info-Layer	Description	Values	Sensors	Temporal res.	Spatial res.
"Cover"	Detection of the Snow Cover	SCA 0/1 or FSC [%]	mainly optical sensors	daily or aggregated	5 km to 250m
"Status"	Status of Snow Cover, e.g. wet / melting / dry	Binary 0/1	passive or active microwave	daily or 2-3 a week	25 km to 100m
"Water"	Snow Water Equivalent	[mm]	passive MW, in-situ, models	Daily or aggregated	25 km to 1 km



# Status and perspectives of existing European snow monitoring initiatives

## Summary Day 1

„Cover“



Spatial Resolution

low



high

Coverage  
pan-european



regional

Application Area  
Climate



Downstream

„Status“



„Water“



H-SAF

GlobSnow

Polar View

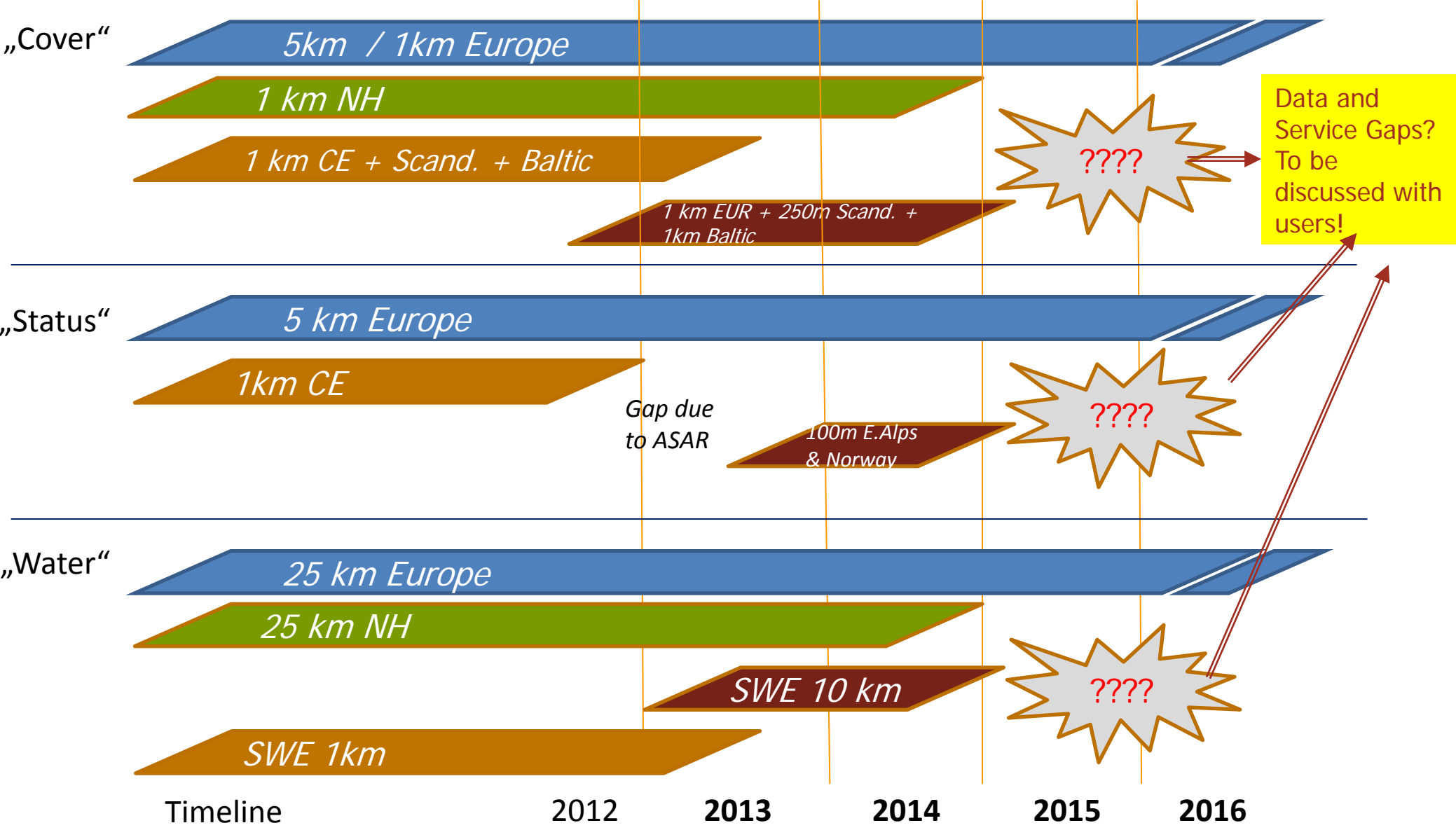
Cryoland

simplifications regarding resolutions and product algorithms!!



# Status and perspectives of existing European snow monitoring initiatives

## Summary Day 1



# Agenda Day 2



- 9:15      **User / provider dialogue** on experiences, expectations and perspectives for snow monitoring services (Chair: Florian Appel, VISTA)
- Roundtable discussion with short contributions by key users
- 10:30      Coffee Break
- 11:00      **Continued discussion** according seed questions from Users / Provider Dialogue  
Chair: Kari Luojus, FMI
- **Achievements and obstacles**
  - **Science and service operation gaps**
  - **Collaboration and coordination gaps**
- 12:00      **Identification of recommendations** on European Snow Monitoring Perspectives  
Chair: Barry Goodison, WMO
- **Transition of services**
  - **Service evolutions**
  - **Short term and long term perspectives**
- 13:00      **Feedback discussion & Snow White Paper set on**  
Chair: Lothar Schüller, EUMETSAT
- Wrap up
- 14:00      Good Bye