Questionnaires

Evaluation of the WG3 questionnaire

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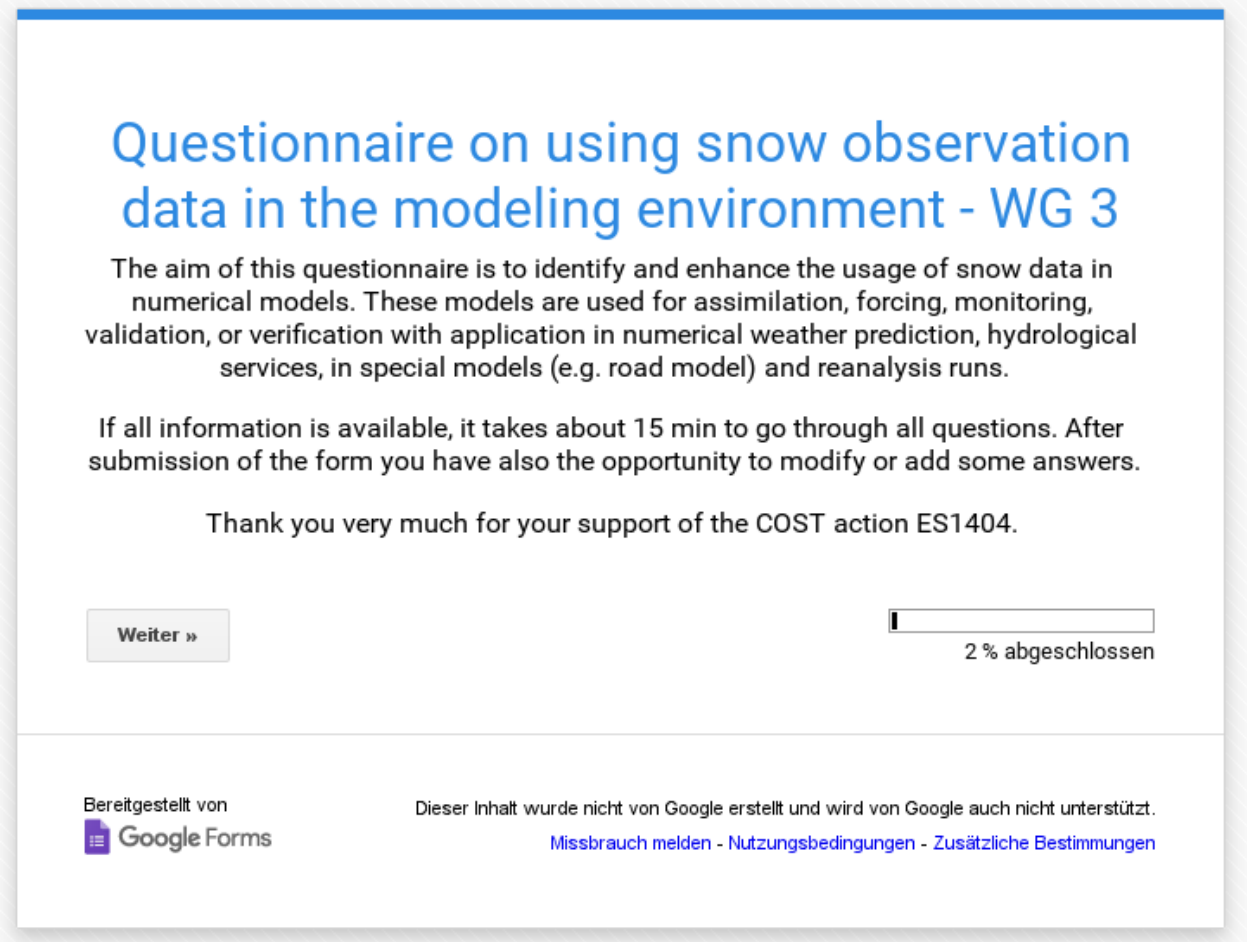

Questionnaire on using snow observation data in the modeling environment - WG 3

The aim of this questionnaire is to identify and enhance the usage of snow data in numerical models. These models are used for assimilation, forcing, monitoring, validation, or verification with application in numerical weather prediction, hydrological services, in special models (e.g. road model) and reanalysis runs.

If all information is available, it takes about 15 min to go through all questions. After submission of the form you have also the opportunity to modify or add some answers.

Thank you very much for your support of the COST action ES1404.

Weiter »

2 % abgeschlossen

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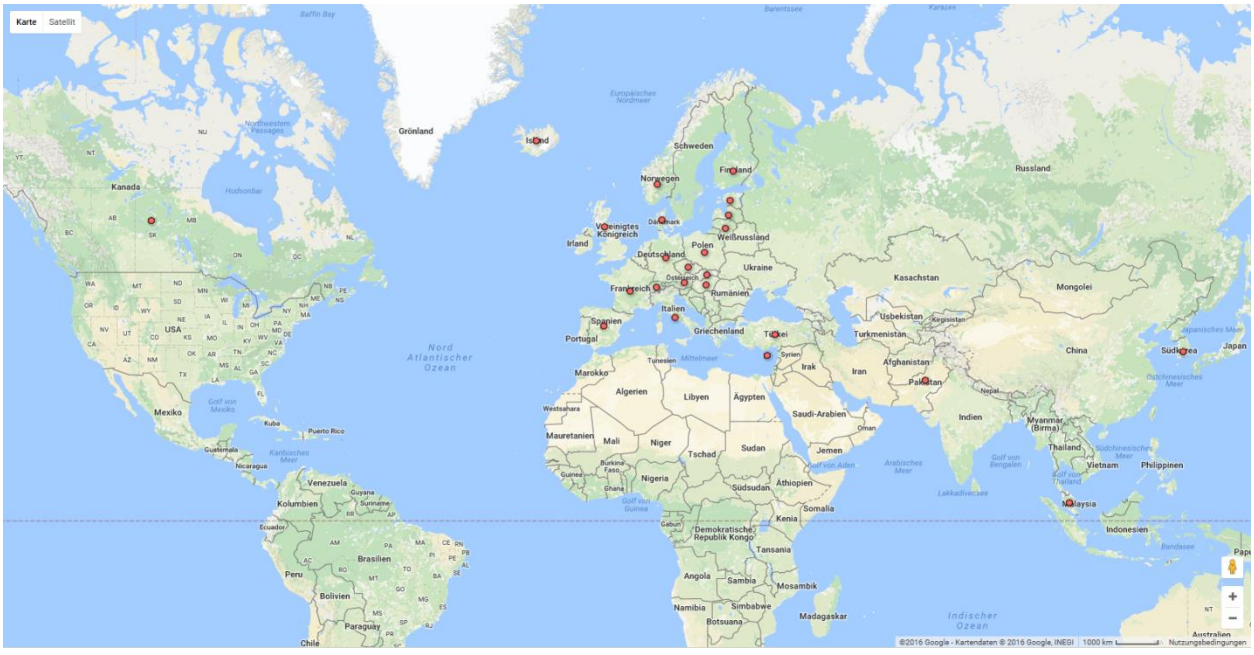
Participating countries



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Modeling environment and snow observation data

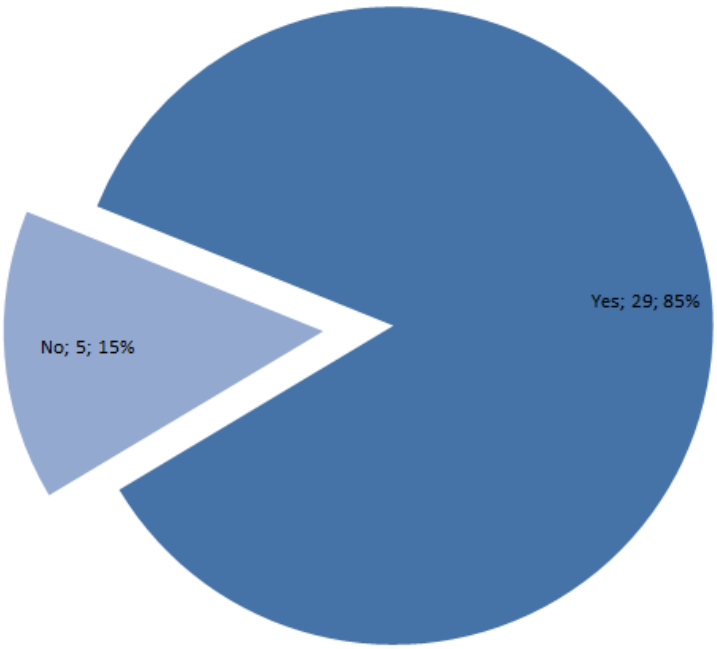
Do you use snow observation data in your modeling environment *

Examples: NWP, Hydrology, Snow models

- ○ Yes
- ○ No

« Zurück Weiter »

7 % abgeschlossen



If possible, please give some reasons for no use of snow observation data.

Not enough information in real time, density of the network, no proper scheme applied for snow assimilation so far.

Not enough information in real time, single snow observation point, difficulties in incorporating snow data into modeling environment (mostly computational)

Not enough data to use, both field data and remote sensing data. A extensive program has been initiated to gather snow information. Hopefully within the next 2-3 years it will be included in modelling for our water resources models

Organisation of modeling system that be use don't use snow observatuion data, modeling system calculates it.

Run only limited area NWP model over tropical region.

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

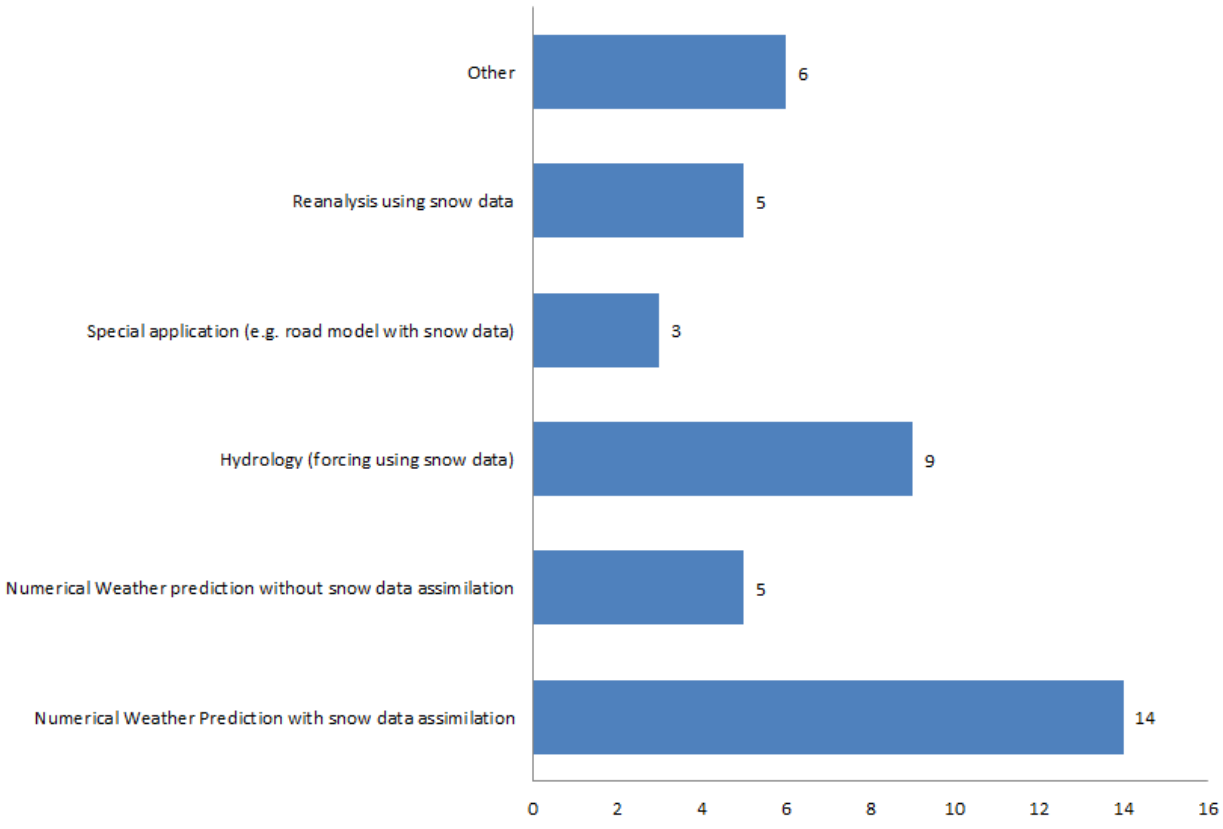
Modeling environment

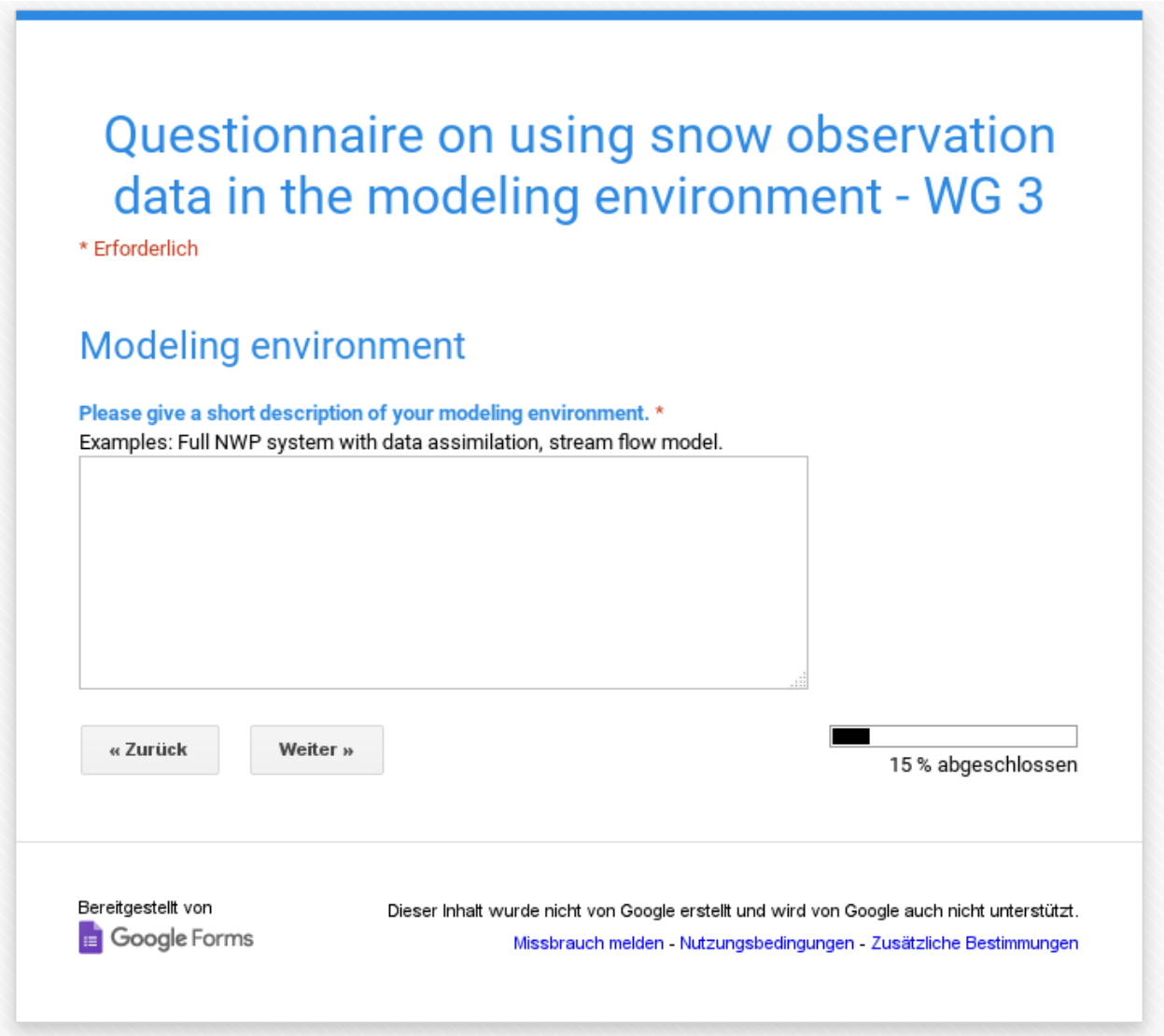
In which modeling environment you are using snow observation data? *

- [ ] Numerical Weather Prediction with snow data assimilation
- [ ] Numerical Weather prediction without snow data assimilation
- [ ] Hydrology (forcing using snow data)
- [ ] Special application (e.g. road model with snow data)
- [ ] Reanalysis using snow data
- [ ] Sonstiges:

« Zurück Weiter »

13 % abgeschlossen


Other
6
Reanalysis using snow data
5
Special application (e.g. road model with snow data)
3
Hydrology (forcing using snow data)
9
Numerical Weather prediction without snow data assimilation
5
Numerical Weather Prediction with snow data assimilation
14
0
2
4
6
8
10
12
14
16

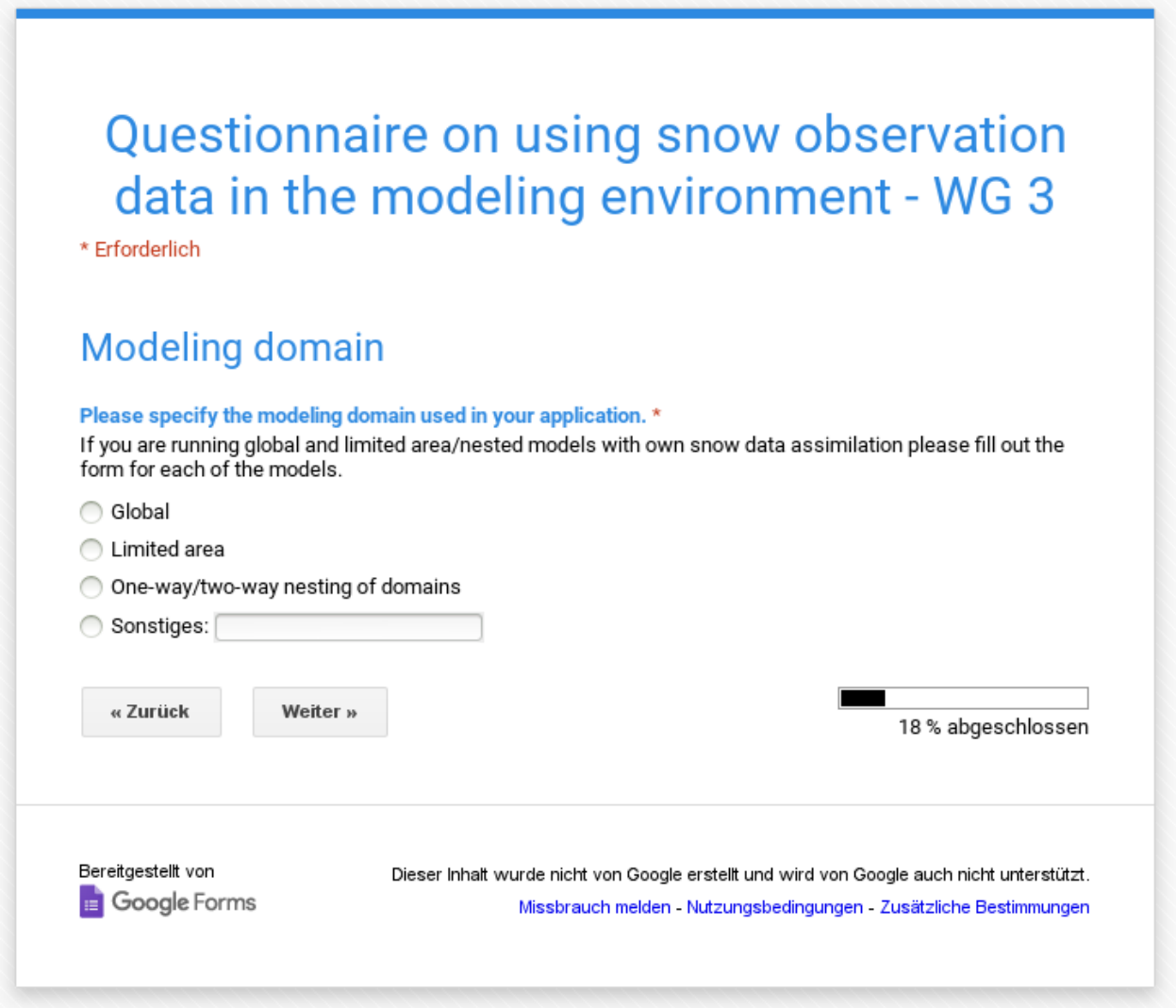


- Full NWP system with snow data assimilation
- Operational snow cover model (SNOWGRID) coupled to INCA Nowcasting system operated in near realtime (15 min time, 100 m spatial resolution) and to ALARO for a 72-H forecast, reanalysis possible back to 2006. Output are gridded snow depth and SWE fields that are used for diverse customer products (avalanche warning services, hydropower and electrical companies, road maintenance services, local municipalities, winter tourism,...) and to initialize/correct the initial snow cover for the NWP model AROME operated at ZAMG. At that time, in-situ snow observations and remote sensing data (e.g. MODIS fractional snow cover) data are only used to validate the model or to improve specific processes. Currently we are investigating the added-value of an operational data assimilation using those data.
- Process-oriented modelling system with snow data usage for the validation.
- Full NWP system with data assimilation (global, limited area mode)
- We use the surfex model in research mode to model the evolution of the snow cover.
- HIRLAM - HARMONIE full high-resolution limited area NWP models with data assimilation. This reply concerns the FMI operational system in its present form.

- Full NWP system with data assimilation. Snow depths observations assimilated by Optimum Interpolation.
- Full NWP system with data assimilation
- Full LAM NWP system with data assimilation (COSMO-7, COSMO-2, COSMO-1, COSMO-E)
- Grid-based physical snow model with focus on the formation of precipitation supply (being the total runoff formed by snow melt and rain falling into the snow layer and not being retained). Analysis of the past 30 hours and forecast of the next 72 hours, 4 times a day (00, 06, 12 and 18 UTC). Use of observations (synoptic data, precipitation, snow depth, snow water equivalent) during the analysis phase and of NWP data during the forecast phase. Snow data serve as reference for the model state during analysis. If differences between model and observations surpass a certain threshold, model is adjusted to the observations (weighted adjustment, not entirely).
- Surface re-analysis on european scale (UERRA project) and snow model to provide snow cover and characteristics at 5km;
- Fully coupled (land and atmosphere) NWP system, with data assimilation.
- Full NWP system with data assimilation - fully coupled land-atmosphere
- Off-line land surface models with and without data assimilation
- Hydrological modeling
- Operational snow melt modelling framework with data assimiliation of available snow monitoring data @ Switzerland / 1km grid resolution
- Full NWP system with data assimilation (AROME at 2.5 km and ALARO at 8 km) Snow is not assimilated in the NWP models. It is cycled from one model run to the other through the first guess in the data assimilation system. Snow data is used for the validation of the snow in the models. Snow data assimilation is planned to be used operationally somewhen in future, when it will be available in the ALADIN/AROME code.
- Limited area NWP models AROME 2.5km and ALARO 4.8km both running with ISBA surface scheme (Noilhan and Planton 1989) and Optimal Interpolation "CANARI" for soil temperature and soil moisture initialisation Mahfouf 1991/Bazile 2000. AROME is also running with 3D-Var for atmospheric initialisation and 3 soil layers SURFEX scheme (ALARO 2 layer online ISBA). For snow we use a daily 1km MODIS product from ENVEO company for yes/no decision satellite no snow->snow is removed from the model if any, satellite snow but model not -> snow is set to constant value. In AROME, snow initial values over Austria are replaced by the a data of an external snow model "SNOWGRID" developed at ZAMG by Olefs et al. Furthermore a additional snow melting is done in the OI-system if 2m temperature exceeds 0°C. So, there is no real snow assimilation considering observation and model errors of snow, but just some replacement of initial data. Prognostic snow variables are SWE, snow albedo and snow density. Only the first is initialised, while the other start with a constant value for fresh snow and then develop according to the prognostic functions of the ISBA scheme.
- Full NWP systems with data assimilation (HIRLAM and HARMONIE)
- Verification of NWP models AROME and ALARO. Verification of CROCUS snow model.
- Full NWP system with data assimilation, in AROME-MetCoOp and AROME-Arctic
- Snow models within land surface schemes - may not be entirely relevant to this questionnaire but I will proceed anyway!
- Limited Area NWP model with snow data assimilation, with OI.
- A snow cover-modelling technique to simulate snow cover presence/absence and sow depth within the cold season of the year for agrometeorological applications and snow cover climatology.
- A limited area NWP system with data assimilation, road condition modelling in development.
- We are using snow data as input information in hydrological model (HBV) and forecasting system to have information about snow depth and water storage in snow cover.
- Snow accumulation and melt models, spatially distributed rainfall-runoff models
- Calibration and validation of the seNorge-snow modell (energy-Balance ande HBV-snow routine)
- We use Snow Melt Runoff Model (SRM) to estimate the expected discharge in IRS (Indus River System) for Flood forecasting during Summer Season as a result of Snow Melt coupled with Monsoon Rains.SRM is conceptually based upon temperature index model designed to simulate

snowmelt in mountainous areas . SRM is run in a semi-distributed manner. Model Input variables are distributed among several elevation zones (each with approximately 500m of relief), and include daily estimates of air temperature, precipitation, and snow-covered area . SRM also operates on a daily time step which eliminates the need to simulate snow pack processes that operate on sub-daily timescales. Following mathematical equation is used in SRM to simulate daily streamflow discharge Q (m3 s-1): Qn+1= Qn kn+1 + (1-kn+1) f Σ [(cSi,n * ai,n (Ti,n + ΔTi,n) Si,n + cRi,n * Pi,n)Ai] (1)

- Global NWP System with snow data Assimilation



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Modeling domain

Please specify the modeling domain used in your application. *

If you are running global and limited area/nested models with own snow data assimilation please fill out the form for each of the models.

- ○ Global
- ○ Limited area
- ○ One-way/two-way nesting of domains
- ○ Sonstiges:

« Zurück Weiter »

18 % abgeschlossen

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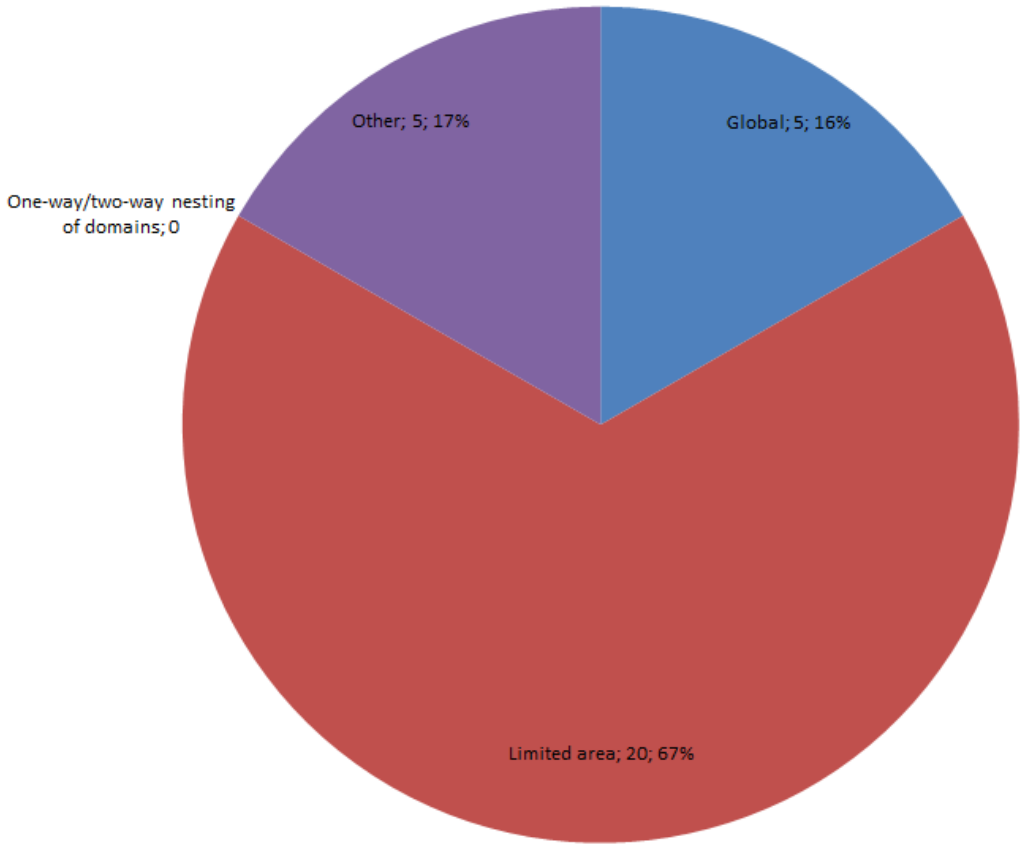


Global	5
Limited area	20
One-way/two-way nesting of domains	0
Other	5

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

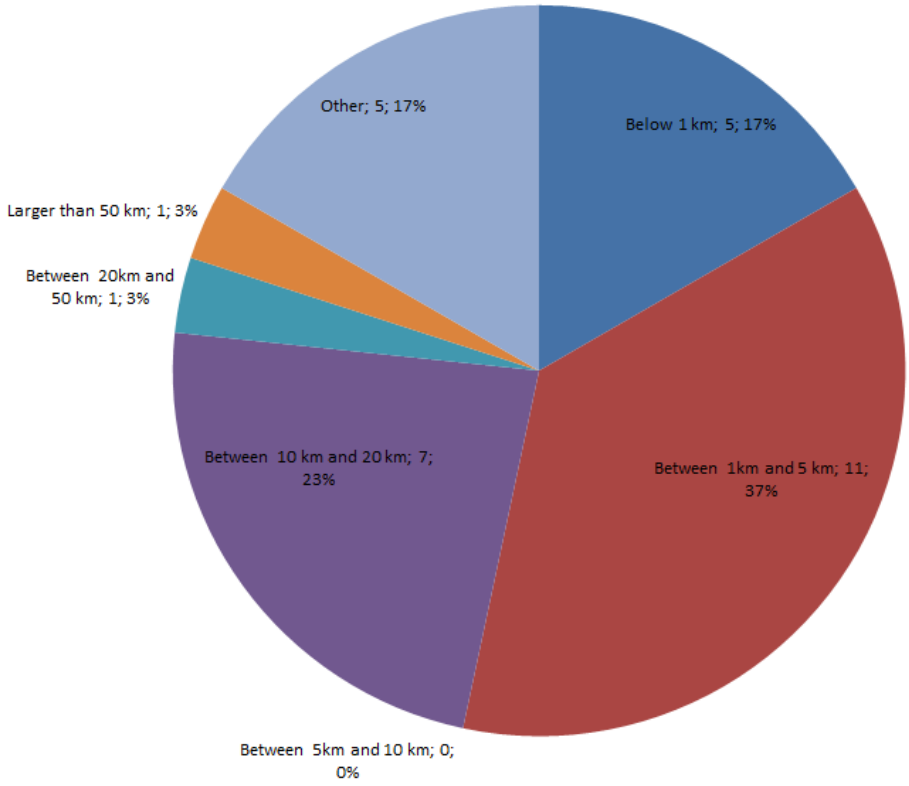
Model resolution

Please specify the model horizontal resolution. *

- ( ) Below 1 km
- ( ) Between 1km and 5 km
- ( ) Between 5km and 10 km
- ( ) Between 10 km and 20 km
- ( ) Between 20km and 50 km
- ( ) Larger than 50 km
- ( ) Sonstiges: [ ]

« Zurück Weiter »

21 % abgeschlossen



Below 1 km	5
Between 1km and 5 km	11
Between 5km and 10 km	0
Between 10 km and 20 km	7
Between 20km and 50 km	1
Larger than 50 km	1
Other	5

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

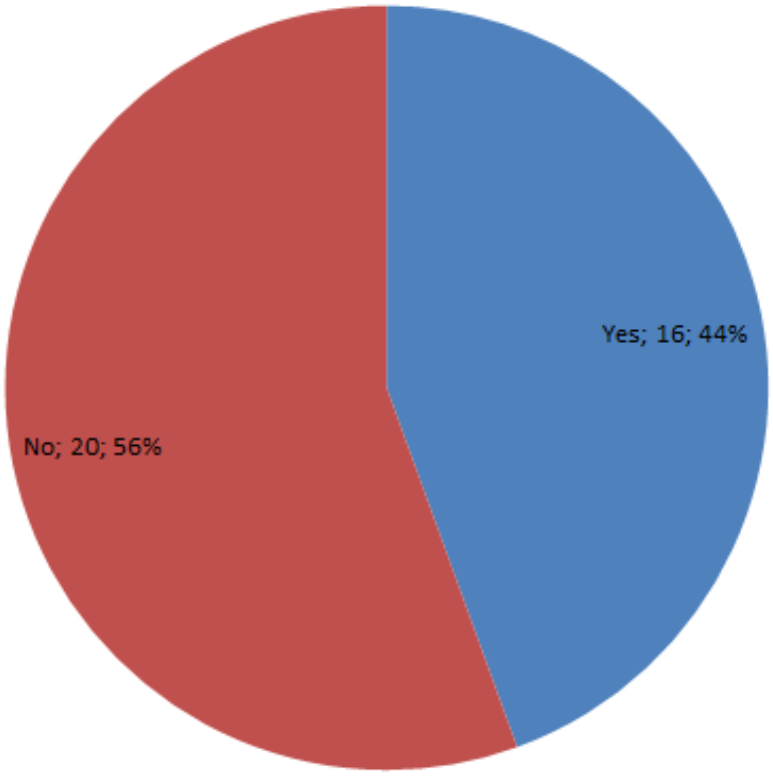
Data assimilation questions

I would like to answer the questions regarding data assimilation *

- ( ) Yes
- ( ) No

« Zurück Weiter »

23 % abgeschlossen


Yes; 16; 44%
No; 20; 56%

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Data assimilation method

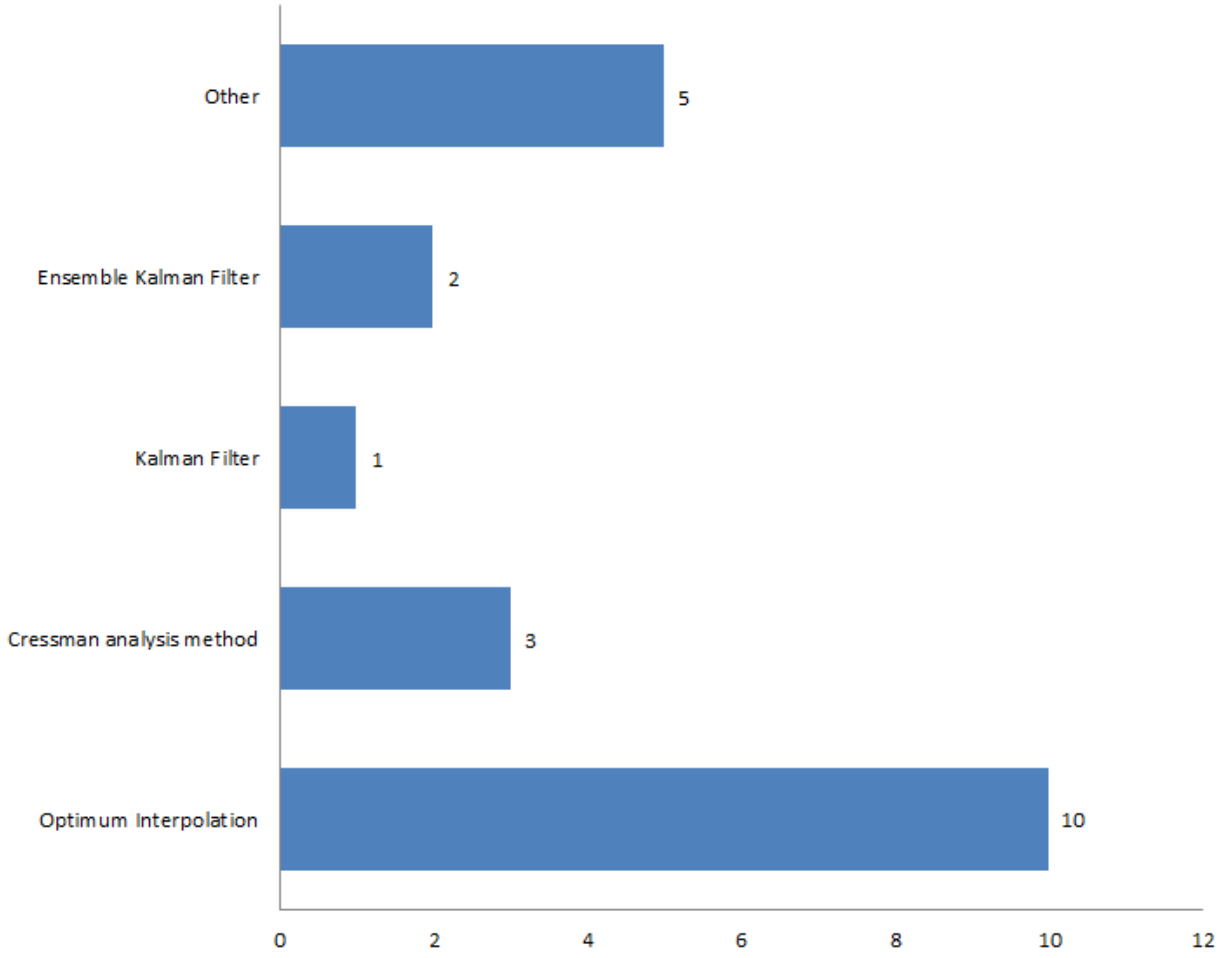
Which data assimilation method is used in your system for snow observations? *

If "other" method is used, please give a short description or reference.

- [ ] Optimum Interpolation
- [ ] Cressman analysis method
- [ ] Kalman Filter
- [ ] Ensemble Kalman Filter
- [ ] Sonstiges:

« Zurück Weiter »

26 % abgeschlossen


Other
5
Ensemble Kalman Filter
2
Kalman Filter
1
Cressman analysis method
3
Optimum Interpolation
10
0
2
4
6
8
10
12

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Data assimilation update frequency

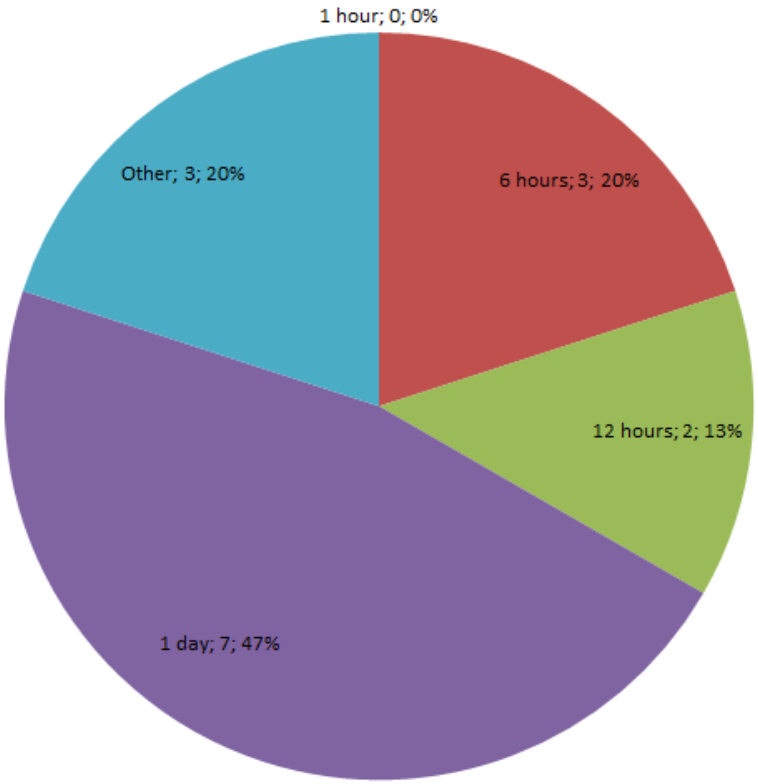
Which update frequency is used for your snow data assimilation? *

Example: data assimilation is running hourly or once a day

- ○ 1 hour
- ○ 6 hours
- ○ 12 hours
- ○ 1 day
- ○ Sonstiges:

« Zurück Weiter »

28 % abgeschlossen



1 hour	0
6 hours	3
12 hours	2
1 day	7
Other	3

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Data assimilation window

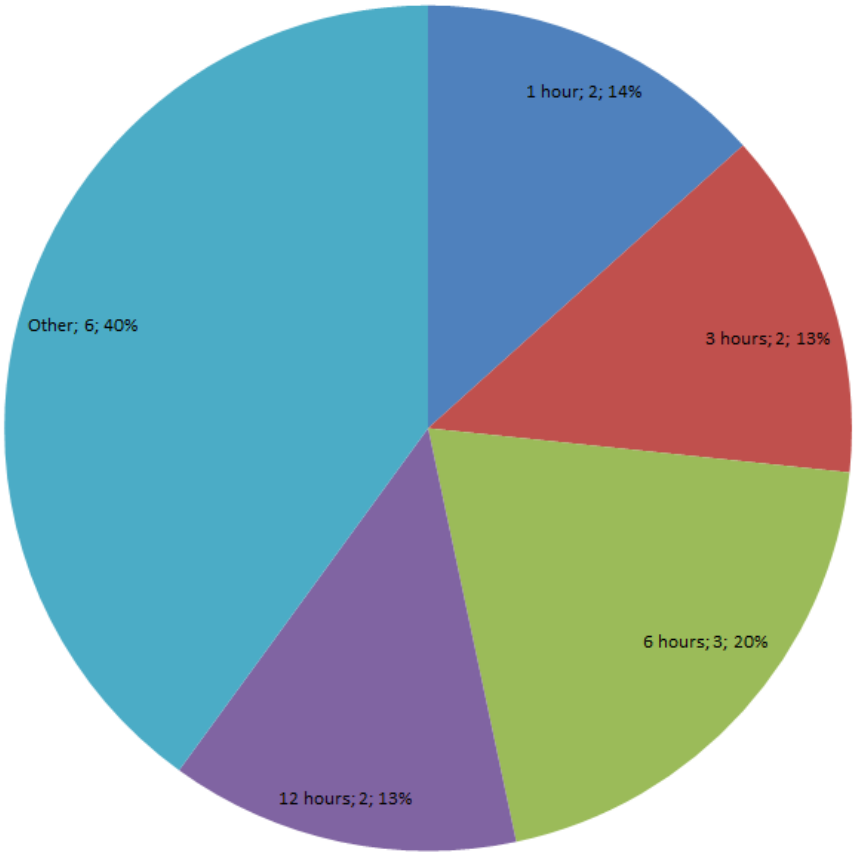
During which time interval (window) snow observations are considered in your snow data assimilation? *

Example: Observations are collected during a prescribed time interval for consideration in the assimilation cycle

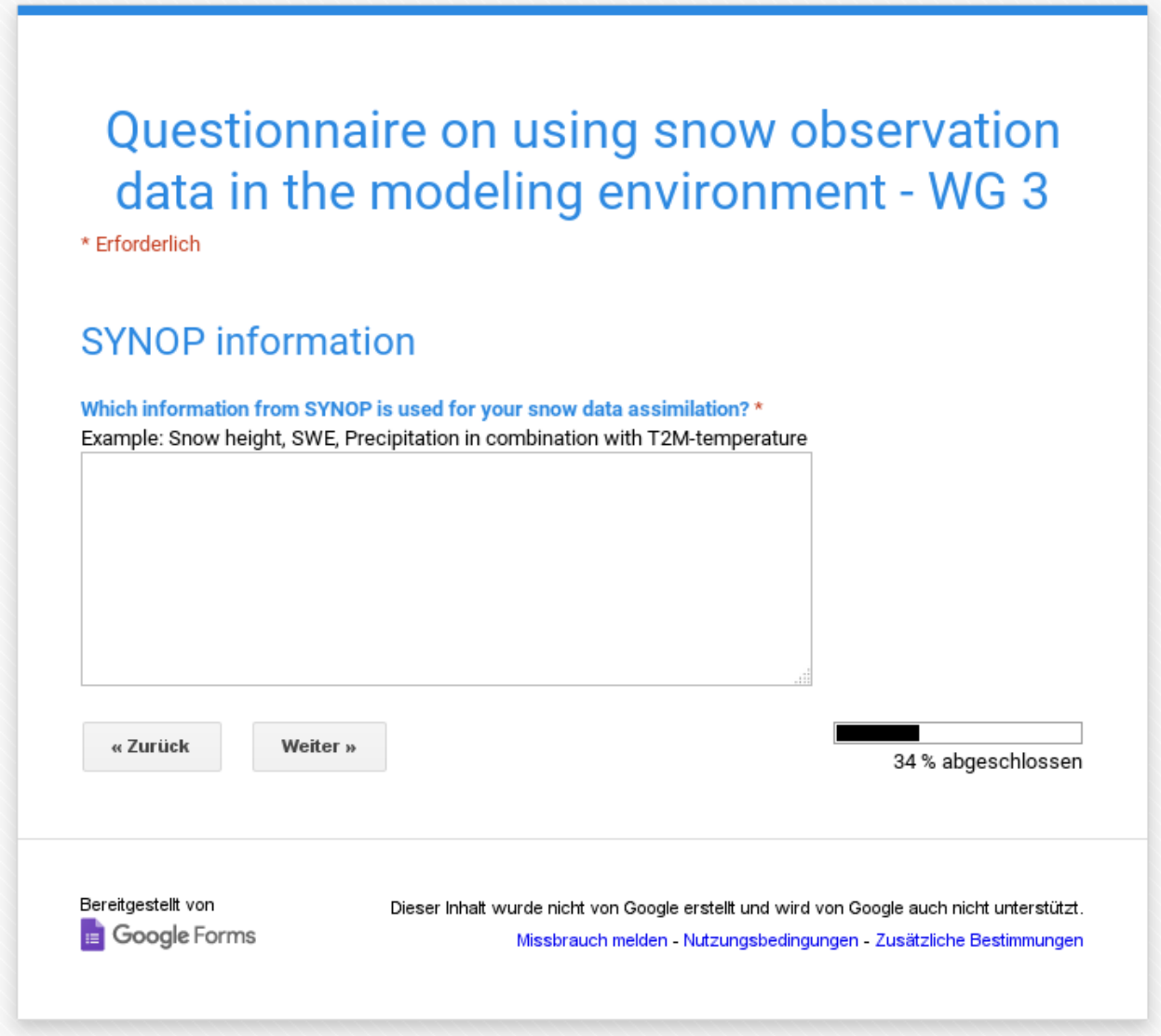
- ○ 1 hour
- ○ 3 hours
- ○ 6 hours
- ○ 12 hours
- ○ Sonstiges:

« Zurück | Weiter »

31 % abgeschlossen

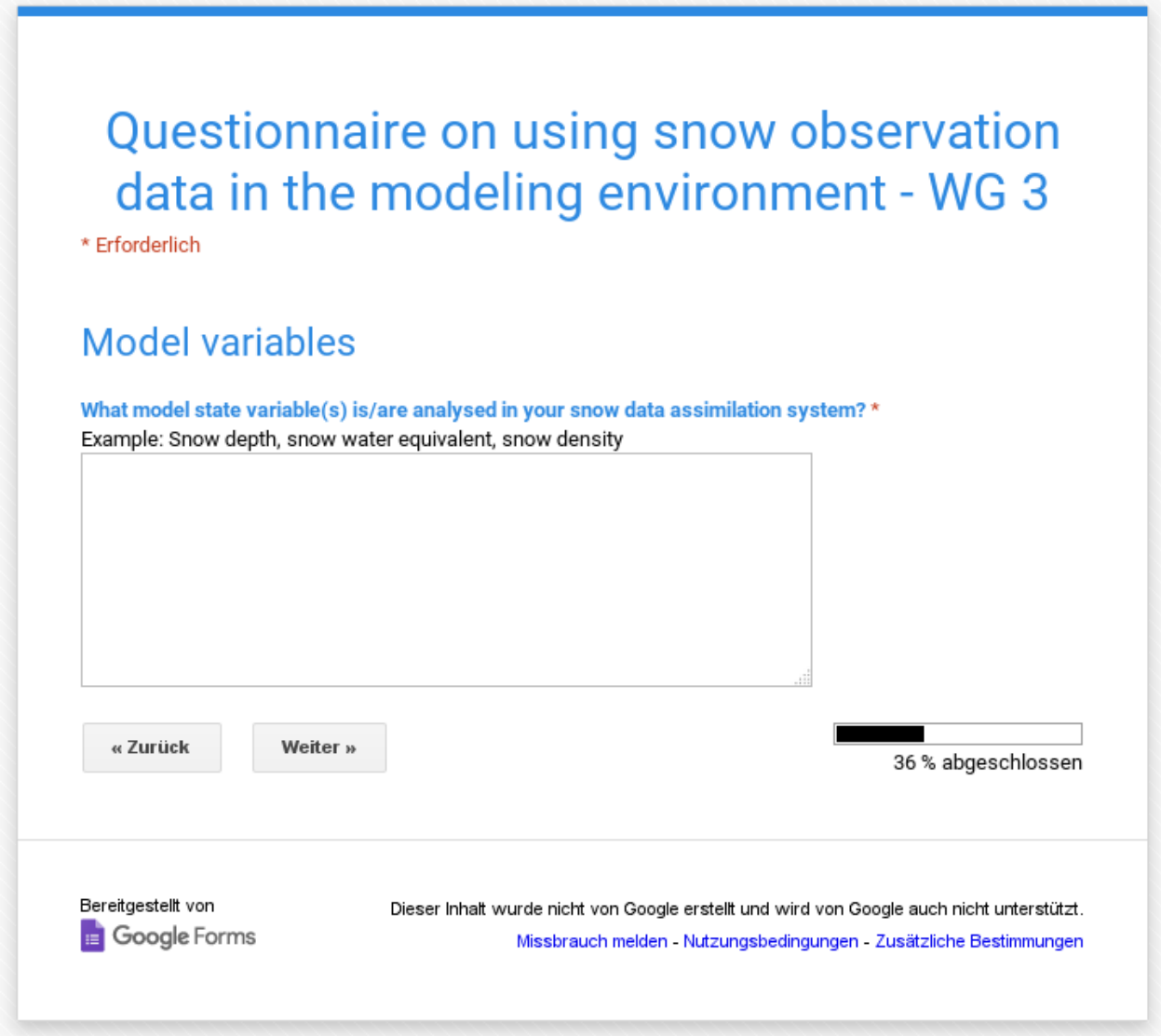


1 hour	2
3 hours	2
6 hours	3
12 hours	2
Other	6



- Snow height
- Snow depth
- none
- Snow height. To my understanding there is no SWE in SYNOP!
- Snow height, Precipitation in combination with T2M-temperature If missing information from ww reports is used to retrieve snow height increments
- snow height, 6-hourly precipitation, T2m, weather type (ww)
- None
- Snow depth, state of ground where available (for diagnosing snow-free) Probably also T2m for quality control.
- No use of Synop
- Snow height, SWE, precipitation and air temperature
- In Snowgrid precipitation and T2m is used in combination from SYNOP and non SYNOP but also RADAR.
- snow height
- SWE
- Precipitation and Temperature

- not yet used synop data in snow data assimilation



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Model variables

What model state variable(s) is/are analysed in your snow data assimilation system? *

Example: Snow depth, snow water equivalent, snow density

« Zurück Weiter »

36 % abgeschlossen

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- SWE
- Snow depth
- snow water equivalent
- Snow Water Equivalent and snow density
- all the snow variables
- Snow water equivalent
- snow water equivalent, snow density, snow pack temeprature, interception water storage
- snow amount (kgm-2) - areal density
- Snow amount (areal density, kgm-2)
- Depth, SWE
- SWE, accumulation and melt rates
- snow depth
- snow amount (kg/m2)

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Processing

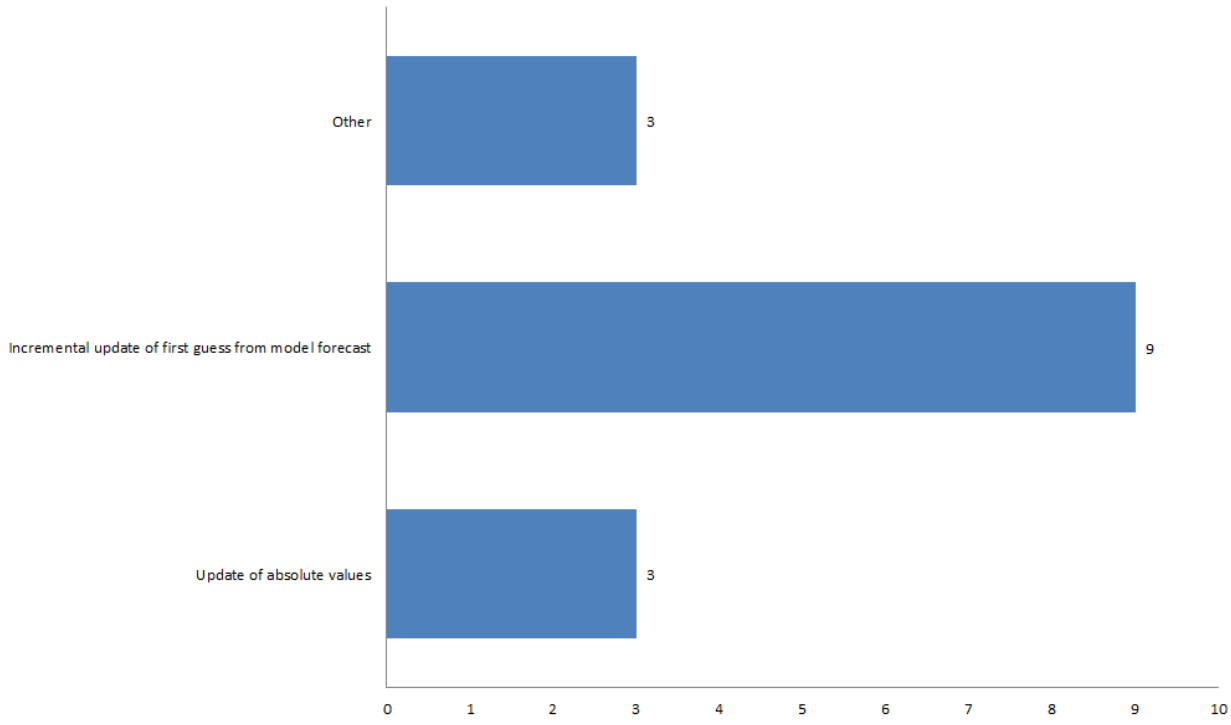
How is the key parameter/ How are the analysed variable(s) processed in your snow data assimilation system? *

Please use also "other" to give a description if the processing differs between horizontal and vertical direction

- [ ] Update of absolute values
- [ ] Incremental update of first guess from model forecast
- [ ] Sonstiges:

« Zurück | Weiter »

39 % abgeschlossen


Other
3
Incremental update of first guess from model forecast
9
Update of absolute values
3
0
1
2
3
4
5
6
7
8
9
10

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

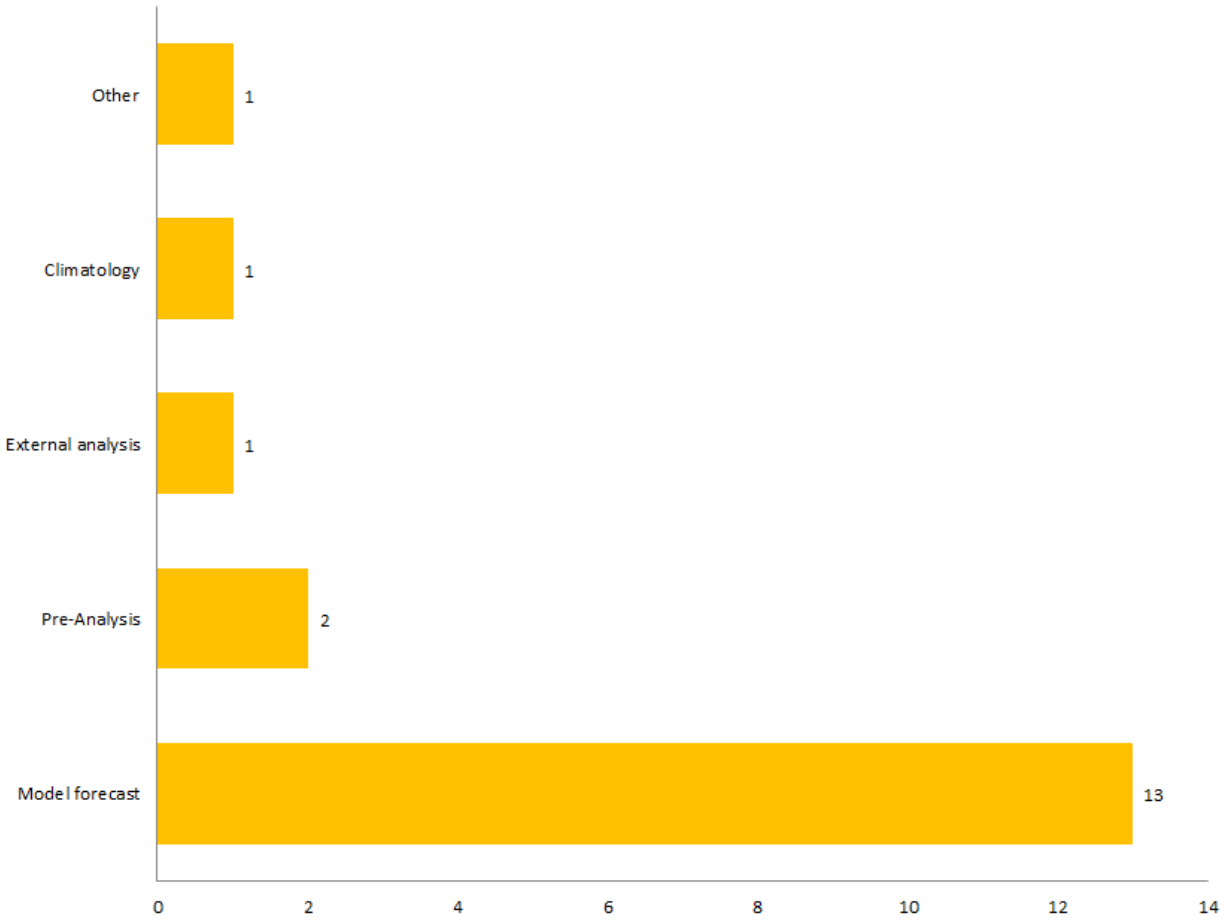
Background field

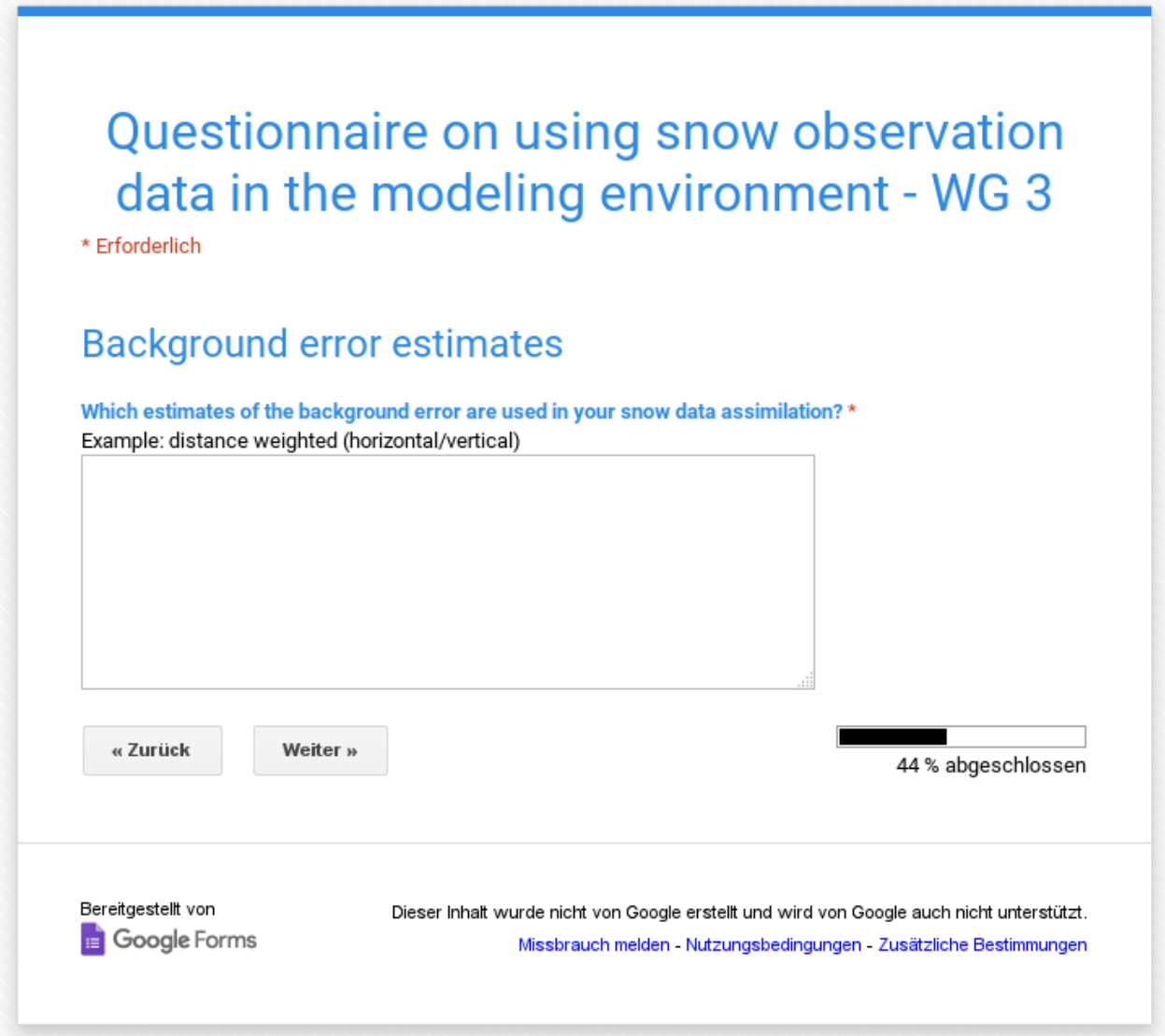
Which background field is used in your snow data assimilation? *

- [ ] Model forecast
- [ ] Pre-Analysis
- [ ] External analysis
- [ ] Climatology
- [ ] Sonstiges:

« Zurück | Weiter »

42 % abgeschlossen


Other
1
Climatology
1
External analysis
1
Pre-Analysis
2
Model forecast
13
0
2
4
6
8
10
12
14



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Background error estimates

Which estimates of the background error are used in your snow data assimilation? *

Example: distance weighted (horizontal/vertical)

« Zurück Weiter »

44 % abgeschlossen

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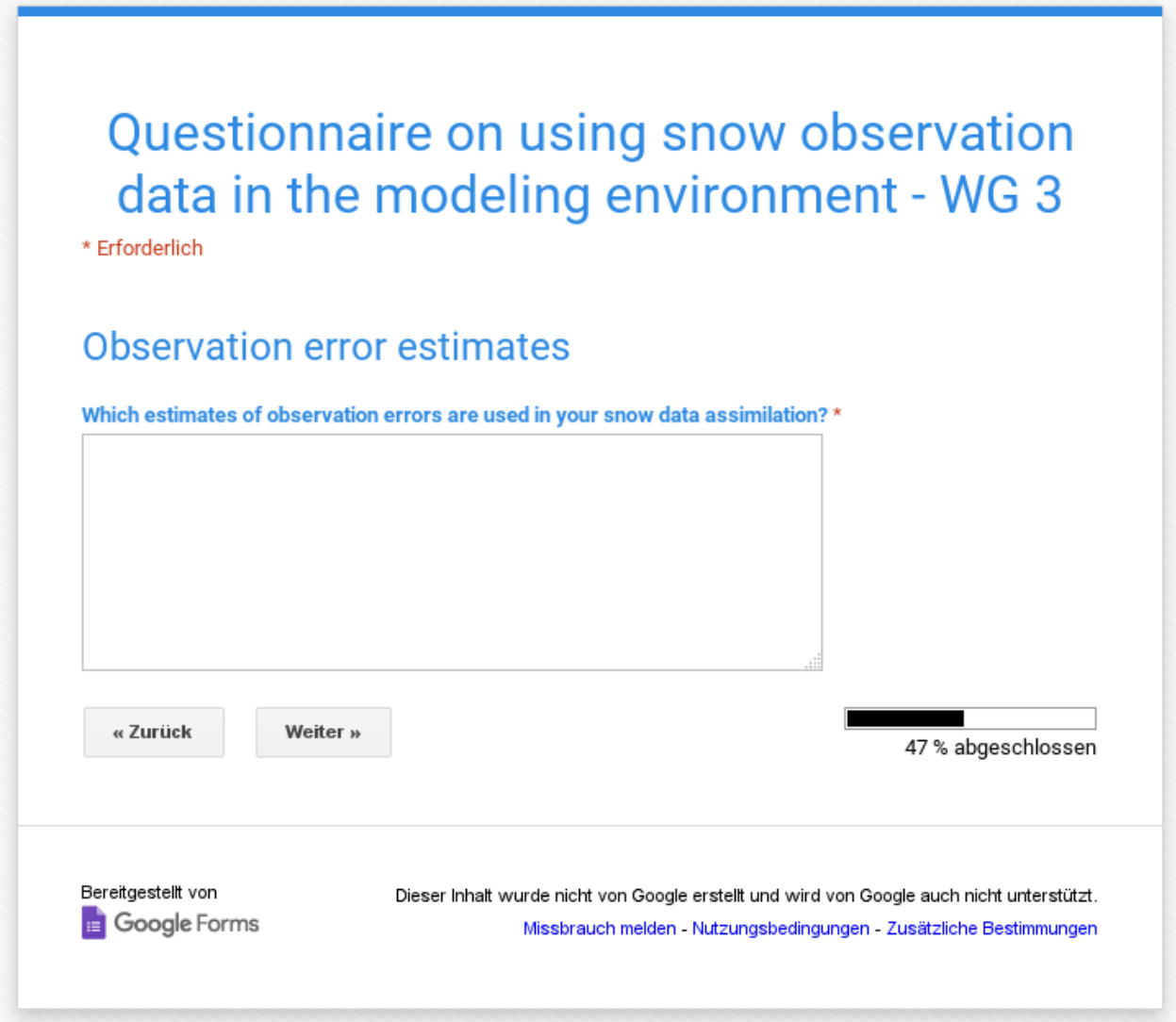
- Distance weighted (horizontal/vertical)
- None
- A fixed value of background error is used. Horizontal and vertical weighted functions are accounted for in the OI.
- Not applicable
- Prescribed constant value (I think)
- Distance weighted (horizontal and vertical)
- Errors are not considered
- Background error not accounted for
- Background error covariances specified as product of background error variance and horizontal and vertical structure functions Horizontal structure function: 2nd order autoregressive function of horizontal separation (of obs and grid point, and of pairs of obs) Vertical structure function: Gaussian function of vertical separation (of obs and grid point, and of pairs of obs) Background error variance: estimate based on other Centres' experience Assimilation scheme still under development, so parameter values not yet finalised
- We have separate data assimilation approaches for snow accumulation and melt within our model framework using optimal interpolation as well as EKF. For details please see: J. Magnusson, D. Gustafsson, F. Hüsler, T. Jonas; Assimilation of point SWE data into a distributed

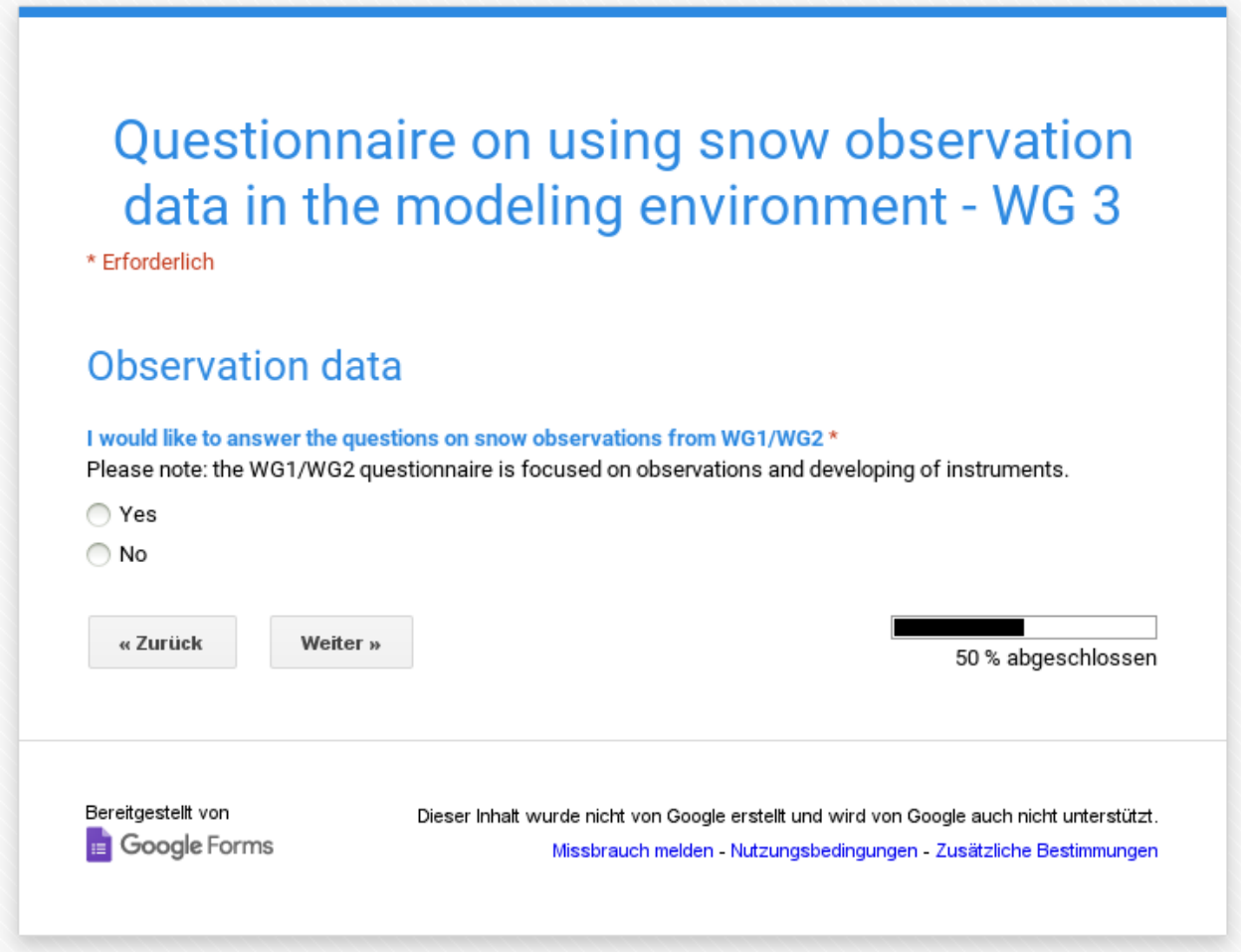
snowcover model comparing two contrasting methods; 2014; Water Resources Research, 50, 7816–7835, doi:10.1002/2014WR015302

- distance weighted
- The BG error for snow depth is 3.1. I don't know the method used for the calculation of this value
- Compare to previous day



- A fixed observation error is used.
- MODIS surface reflectance errors
- Prescribed constant value (in principle different for different observation types, but only SYNOP snow thickness is used)
- Observations are suposed to have uncorrelated errors. Standard deviations of observation and background errors are both 5 kg/ m2.
- None
- Errors are not considered
- Observation errors not accounted for. However, some anomalous observations are identified and rejected from the assimilation by quality control procedures.
- Assumed to be uncorrelated. Observation errors for SYNOP snow depth and snow depth diagnosed from satellite snow cover will be estimated, based on experience of ECMWF.

- multiplicative
- Please see answer to previous question
- None
- Varies for different models
- Standard deviation of error is given in namelist
- 3.3
- Compare to background snow information



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Observation data

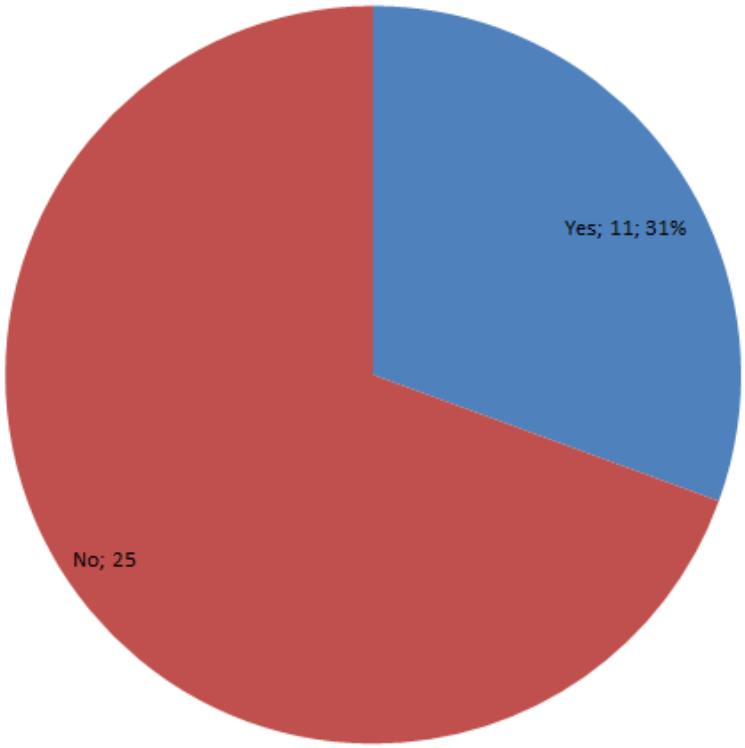
I would like to answer the questions on snow observations from WG1/WG2 *

Please note: the WG1/WG2 questionnaire is focused on observations and developing of instruments.

- Yes
- No

« Zurück Weiter »

50 % abgeschlossen


Yes; 11; 31%
No; 25

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Snow observations and products used in the modeling system

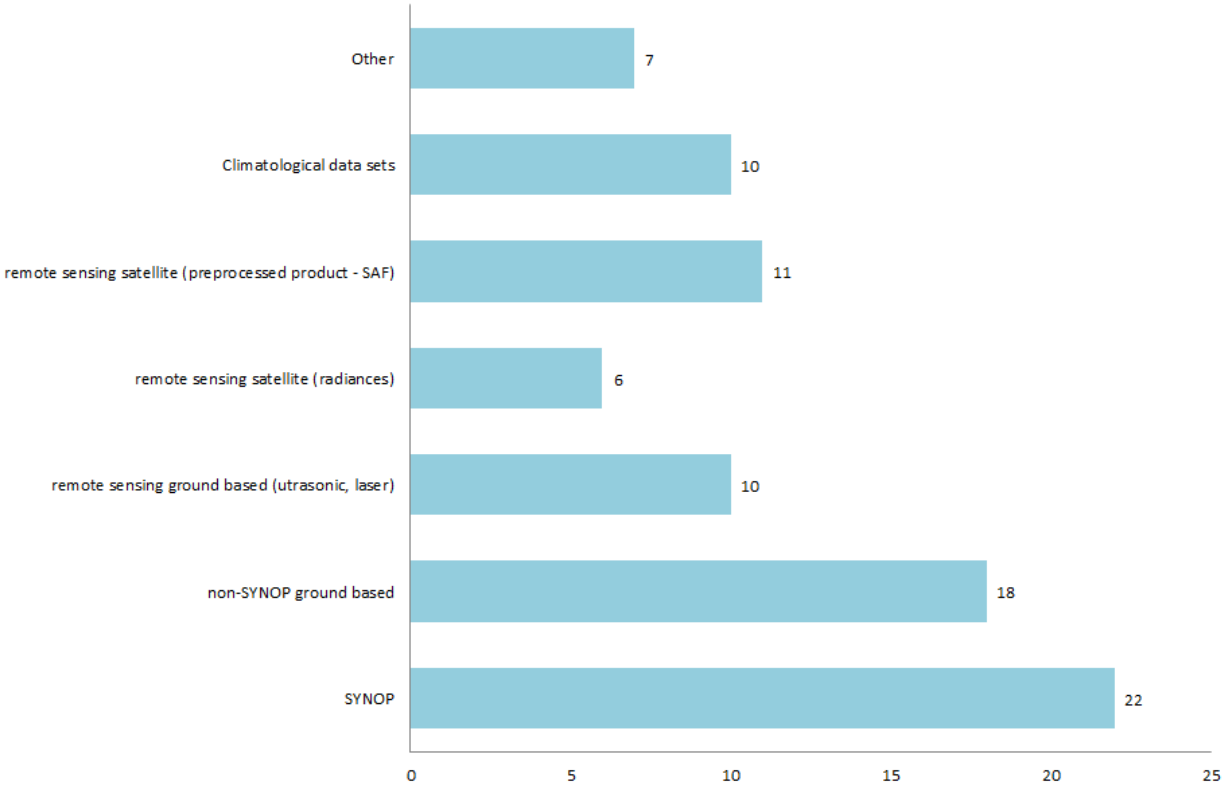
Please describe the snow data sources used for the model application

Snow observations and products *

- [ ] SYNOP
- [ ] non-SYNOP ground based
- [ ] remote sensing ground based (utrasonic, laser)
- [ ] remote sensing satellite (radiances)
- [ ] remote sensing satellite (preprocessed product - SAF)
- [ ] Climatological data sets
- [ ] Sonstiges:

« Zurück Weiter »

57 % abgeschlossen


Other
7
Climatological data sets
10
remote sensing satellite (preprocessed product - SAF)
11
remote sensing satellite (radiances)
6
remote sensing ground based (utrasonic, laser)
10
non-SYNOP ground based
18
SYNOP
22
0
5
10
15
20
25

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Remote sensing ground-based

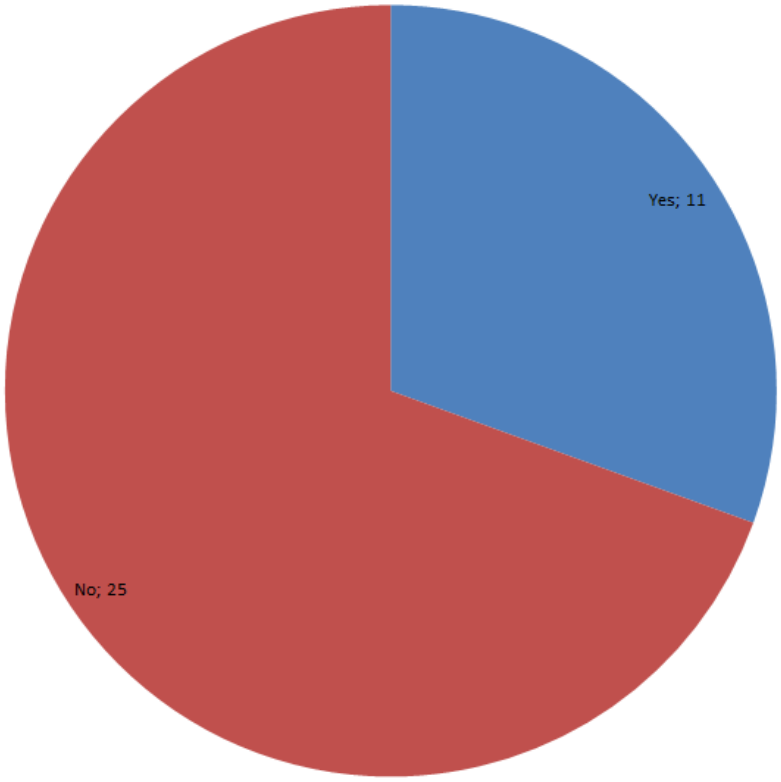
Do you use ground-based remote sensing measurements or products *

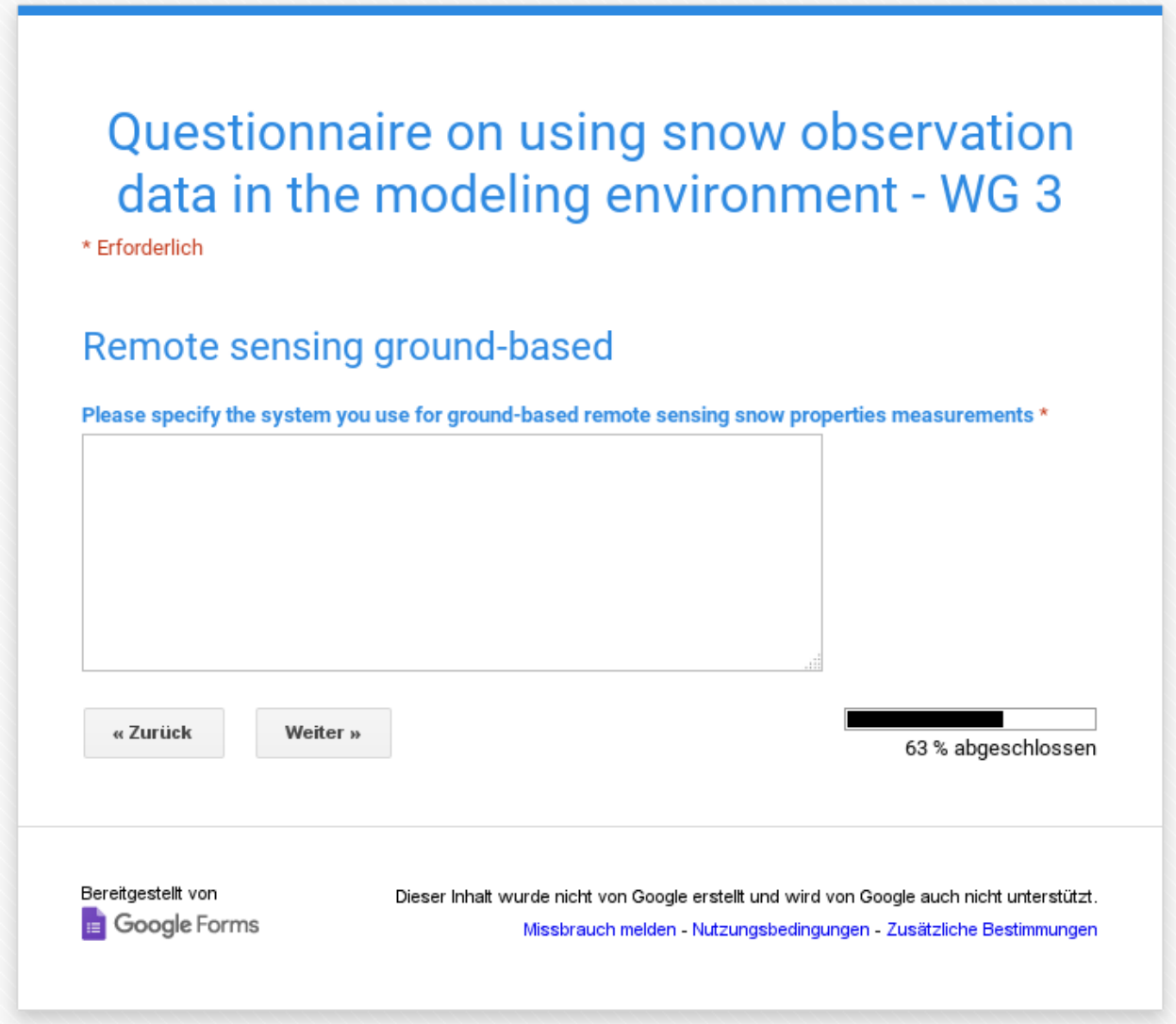
Example: Snow height from ultrasonic or laser scanner

- ( ) Yes
- ( ) No

« Zurück Weiter »

60 % abgeschlossen


Yes; 11
No; 25



- Lufft (Jenoptik) distance measurement with laser. Ground network of 50+ stations across all regions and altitudes in Austria.
- Ultra-sonic
- Ultrasonic depth gauges microwave radiometers
- MODIS
- Campbell SR50 sensors are mounted to stations of the Swiss automatic snow monitoring network IMIS
- USH-8
- Campbell SR50 the main utrasonic snow depth sensor in use in Canada
- Jenoptik SHM 30 Snow Depth Sensor
- Ultrasonic show height elevations sensors. CS725 non contact SWE measurements. Long wave and short wave radiation measurements. Temperature profiles of snow and soil
- Ultrasonic depth sensors

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Preprocessed product

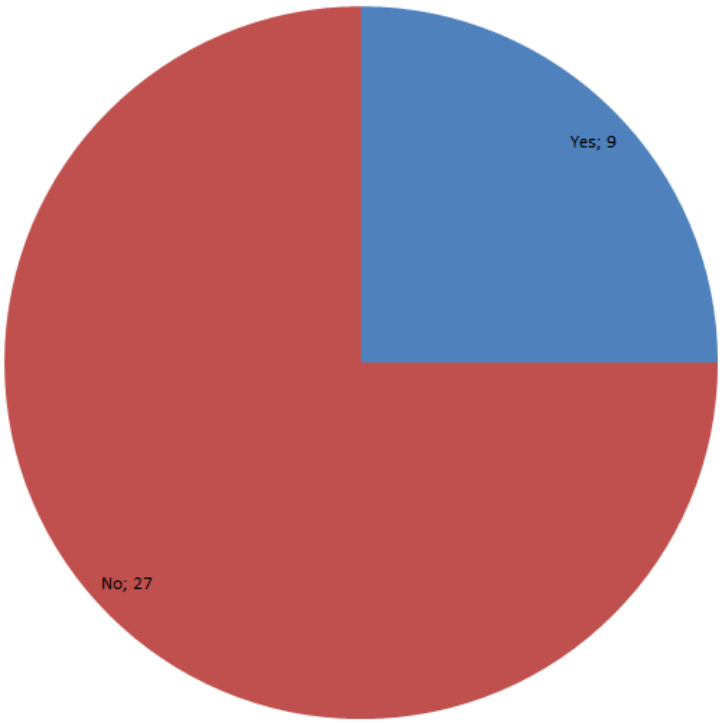
Do you use preprocessed snow products *

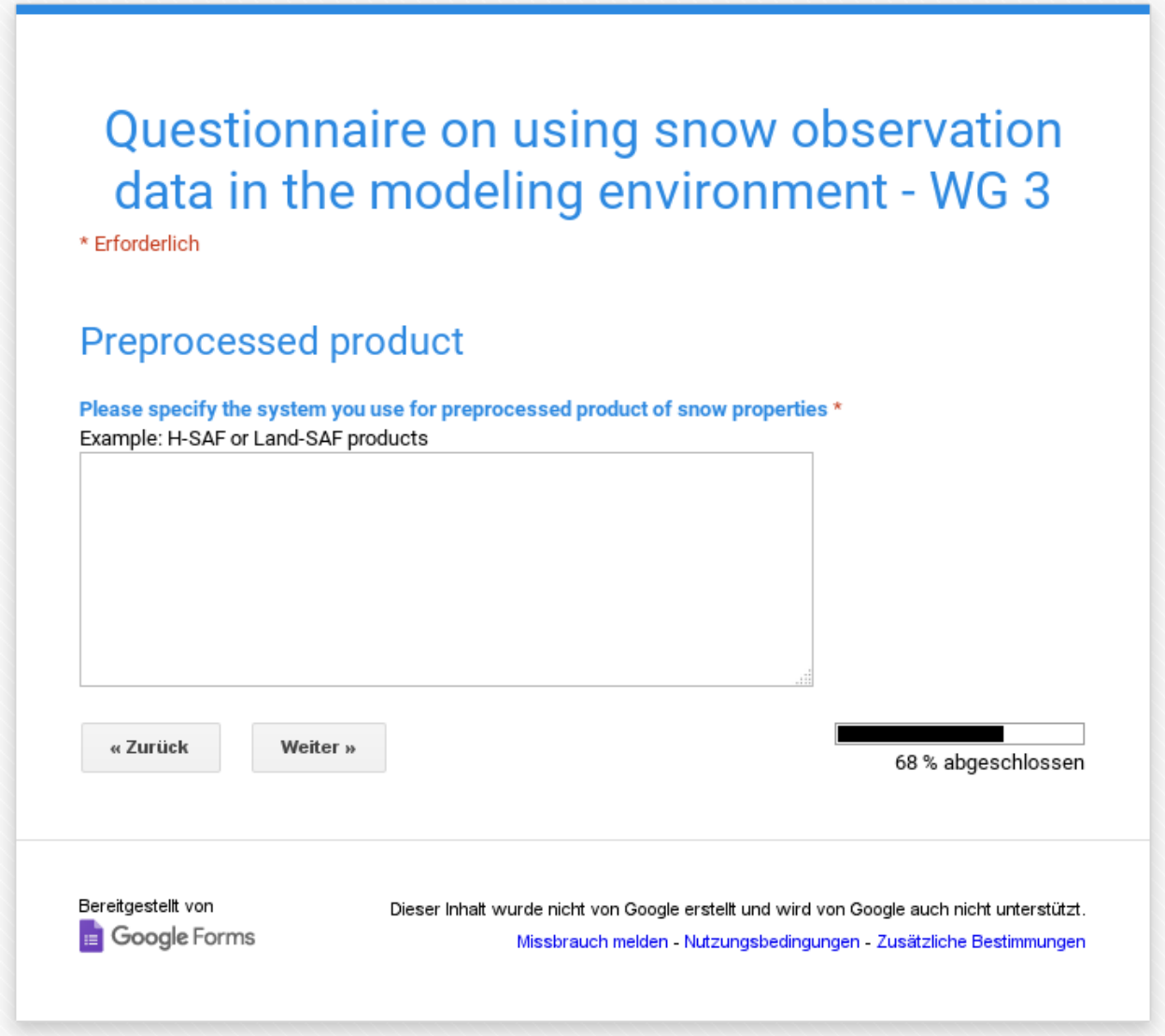
Example: H-SAF or Land-SAF snow products

- (•) Yes
- ( ) No

« Zurück Weiter »

65 % abgeschlossen


Yes; 9
No; 27



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Preprocessed product

Please specify the system you use for preprocessed product of snow properties *

Example: H-SAF or Land-SAF products

« Zurück Weiter »

68 % abgeschlossen

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Missbrauch melden - Nutzungsbedingungen - Zusätzliche Bestimmungen

- IMS snow cover product
- MODIS fractional snow cover 250 m resolution
- Snow depth from IMS snow analysis
- Snow extent from Meteosat (SEVIRI) and from NOAA (AVHRR).
- NOAA NESDIS Interactive Multisensor Snow and Ice Mapping System (IMS)
- H-SAF daily snow cover product (H31)
- ENVEO daily MODIS 1km product of snow cover percentage
- Verification of CROCUS results with satellite measurements
- MERRA, MERRA-land, ERAinterim-land, GlobSnow, MODIS, IMS-24km, IMS-4km, NOAA-CDR, CMC snow depth Analysis

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

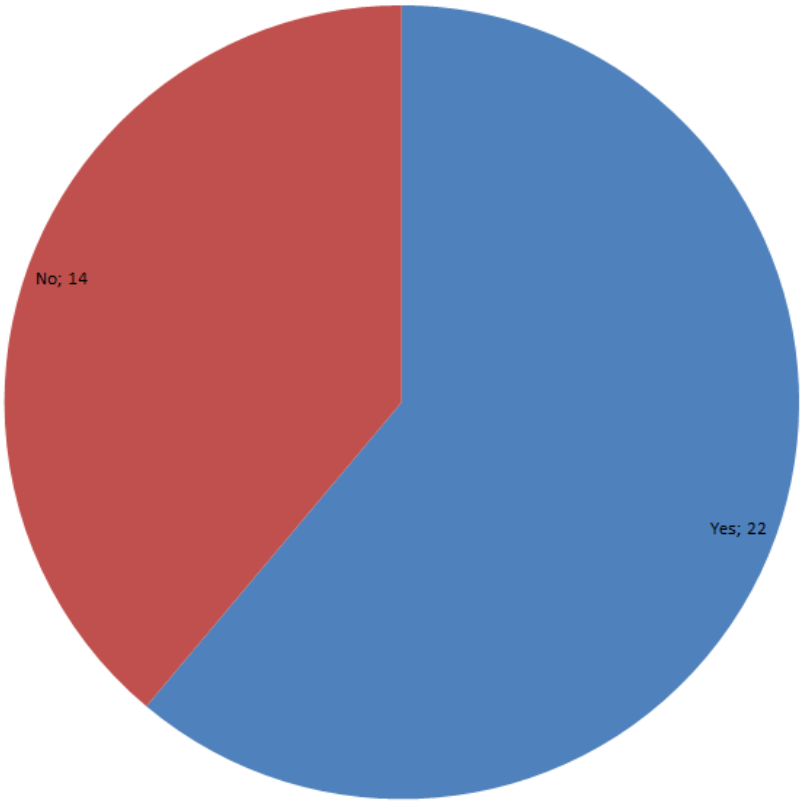
Processing - Quality control

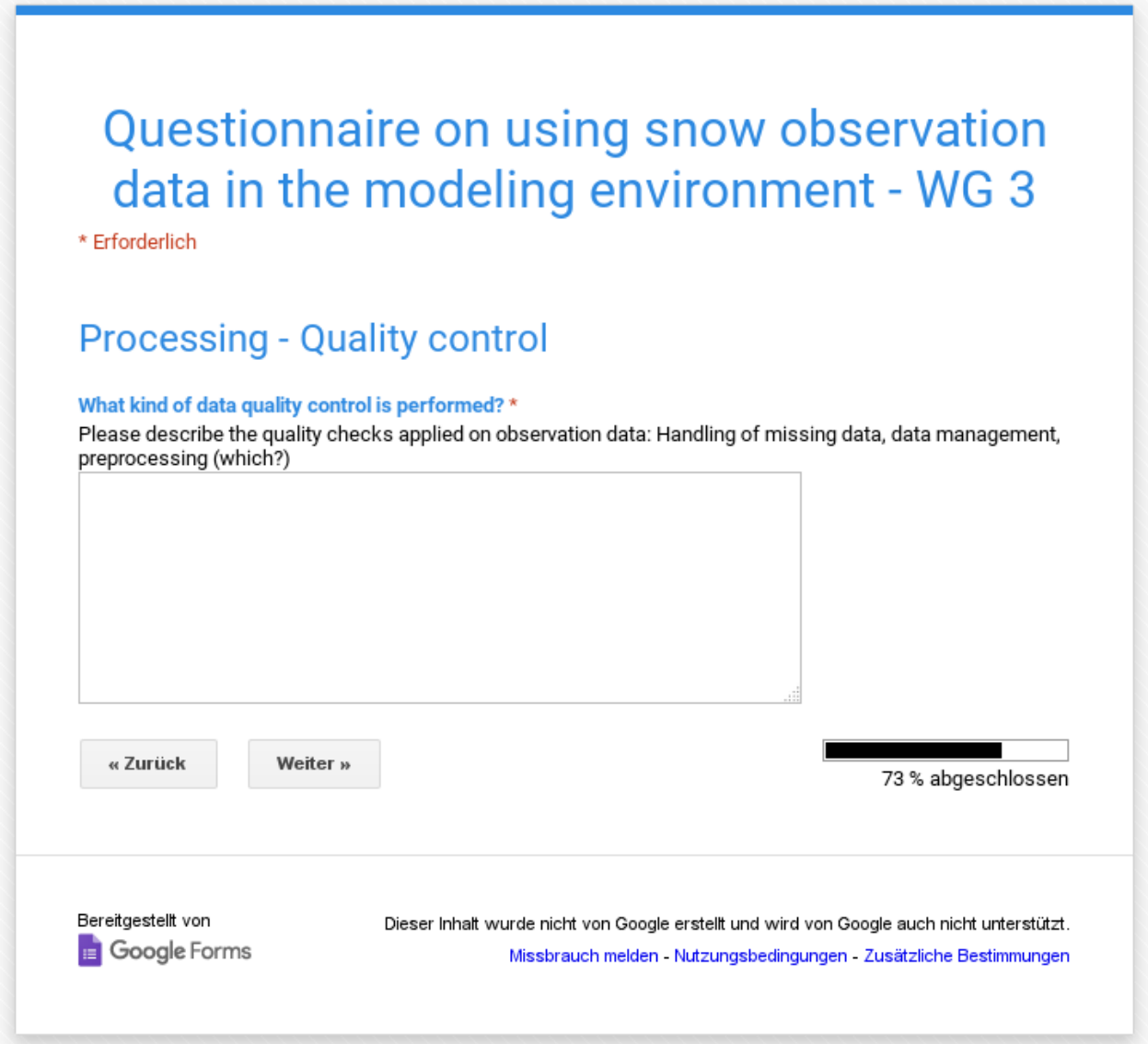
Do you perform a quality control of snow observations or products *

- ( ) Yes
- ( ) No

« Zurück Weiter »

71 % abgeschlossen


No; 14
Yes; 22



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Processing - Quality control

What kind of data quality control is performed? *

Please describe the quality checks applied on observation data: Handling of missing data, data management, preprocessing (which?)

« Zurück Weiter »

73 % abgeschlossen

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Missbrauch melden - Nutzungsbedingungen - Zusätzliche Bestimmungen

- Temperature check, redundancy (in time and space) check, first guess departure check, blacklist.
- Outlier, physical possible range
- Handling of missing data
- Satellite viewing angle filtering
- Check against background, OI check
- Observations are compared to first guess
- h_snow < 1.5[m] x (1+zob/800[m]), with h_snow=snow depth, zob=stationheight, fg-check: dsn_inc(t-1,t) <= 0.8[m] x (1+zob/2000[m]) x max(0,min(1,(287.16[K]-T2m)/10[K])) dsn_inc(t-1,t)=Snow height increment between previous and present analysis.
- At first, observed snow depth is subject to a plausibility check. It is rejected if it exceeds an acceptance limit which depends on station height. Then, a first guess quality control check is performed. Here, the previous snow depth analysis is considered. (see http://www.cosmo-model.org/content/model/documentation/core/cosmoAssim.pdf)
- Check for implausible data (e.g. too warm for snow cover formation depending on elevation and season), outliers (Dixon test).

- 1. A check is made against the model land/sea mask to exclude any obs that fall outside the model land area. 2. Binary snow/no snow obs are resampled onto the model grid to give a fractional cover. Minimum fractional cover and maximum surface temperature thresholds are then applied together to identify incorrectly specified snow cover. 3. Extreme time delays in IMS obs (resulting in missing a new snow event) are controlled by using a day-old model forecast alongside the current day's. The model evolution of the snow event can then be compared with IMS obs and the obs excluded if the event is not represented in the obs.
- Still in development. Plan to include the following: Checks for gross error, based on max O-B values, max surf T with snow Consistency between state of ground and snow depth Use of quality flags in H-SAF product Land/sea checks Max values set for analysis increment (T-dependent)
- Working with relatively small data volumes, so can perform quality control by visual inspection
- Manual processing
- For every single data point: plausibility checks, filling gaps or replacing unplausible data where possible + useful
- Includes manual screening
- Handling of missing data
- QC of surface snow depth observations for climate monitoring. Check the internal consistency of snow depth changes (change from one day to the next) against observed precip and air temperature.
- Manual comparison of recorded data with visual observations provided from web camera.
- Data managment
- Manual quality control
- Validation of automatic measurements (snow depth, water equivalent, density) by manual measurements
- Missing data- and quality control

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Data consistency

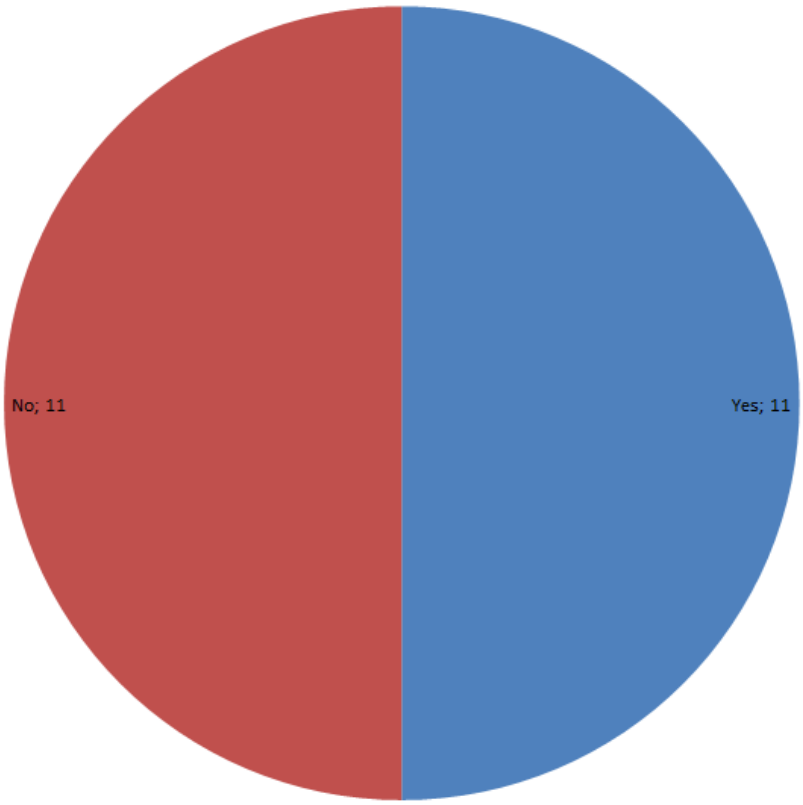
Do you perform a consistency check of snow observations or products *

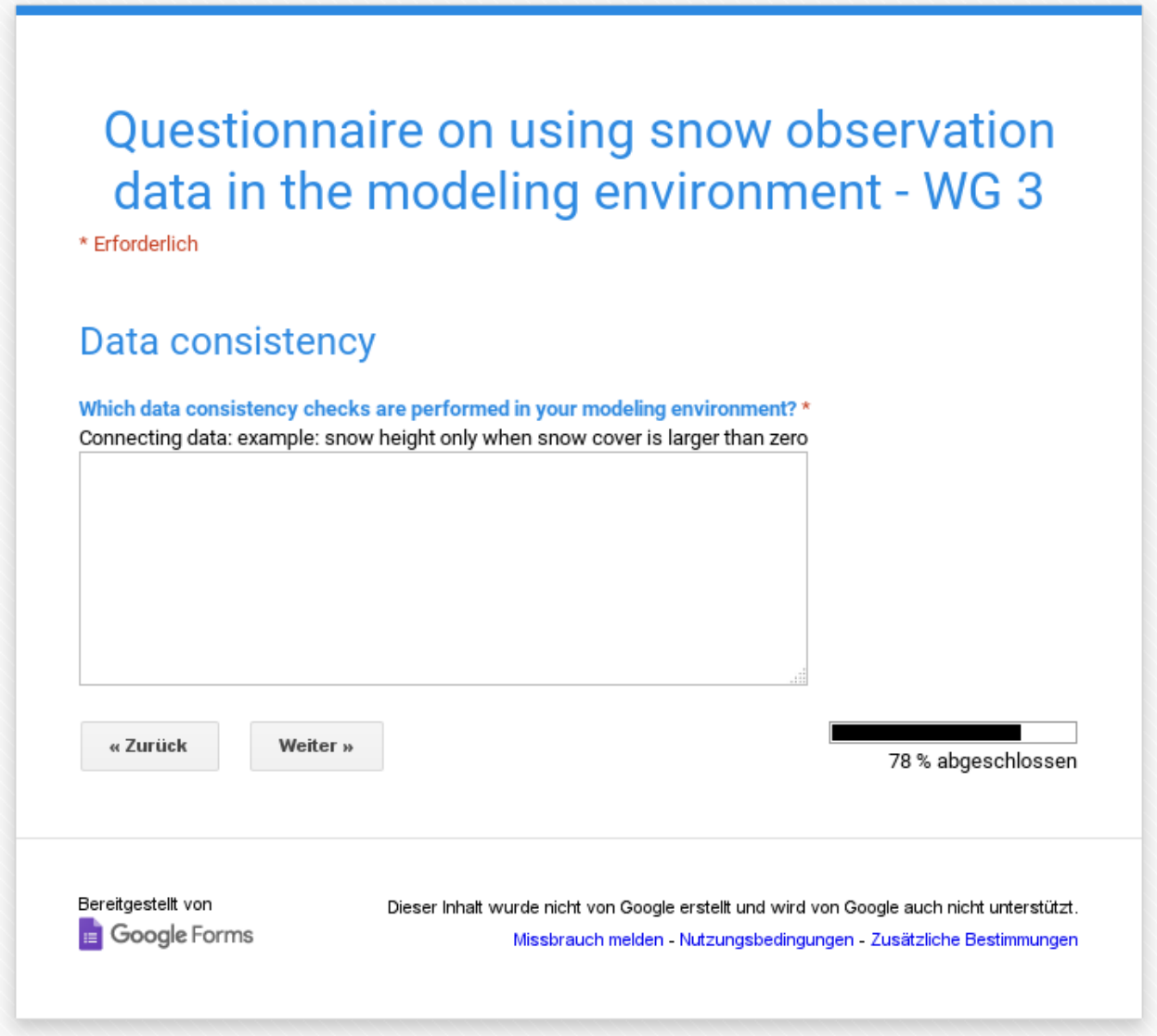
Example: In order to find inconsistent data which passed the quality control

- ( ) Yes
- ( ) No

« Zurück Weiter »

76 % abgeschlossen


No; 11
Yes; 11



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Data consistency

Which data consistency checks are performed in your modeling environment? *

Connecting data: example: snow height only when snow cover is larger than zero

« Zurück Weiter »

78 % abgeschlossen

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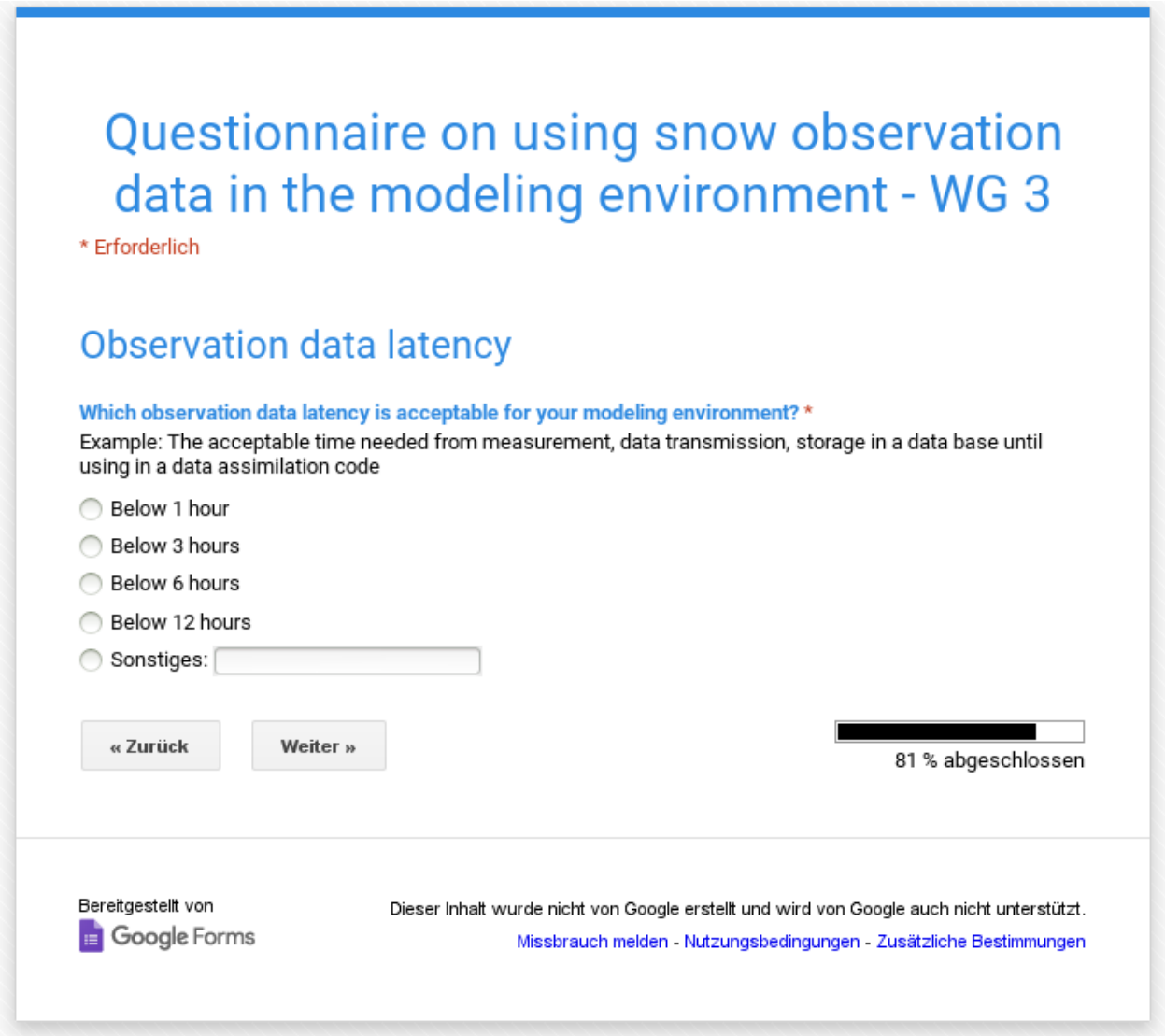
Missbrauch melden - Nutzungsbedingungen - Zusätzliche Bestimmungen

- Limit snow depth depending on air temperature
- Calculation of sum of weights for snow depth (1) and snow depth increments calculated from precip and t2m (2) Use snow height only when weight from contributing obs (1) exceeds min value, use snow depth increment (2) else when average weight of (1) and (2) exceeds min value.
- Snow water equivalent only greather than zero when snow depth is greather than zero.
- Analysis increments will only be added if surface T is below a threshold Snow-free state of ground reports will only be used if snow depth is absent
- Consistency of accumulated snow mass and snowfall
- Manual check
- Apart from the obvious checks we use statistical and visual intercomparision tools between data from similar stations, where similar = same region and same elevation
- Manual checking based on observations changing in time.
- Compare regionally-average time series over regions with relativley dense surface observations.
- The first day with snow cover was considered the first day at the beginning of the cold season in which the snow cover was equal or higher than 1 cm. The last day of snow

cover was the last day at the end of the cold season when the snow cover was equal or higher than 1 cm.

- Manual consistency checks



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Observation data latency

Which observation data latency is acceptable for your modeling environment? *

Example: The acceptable time needed from measurement, data transmission, storage in a data base until using in a data assimilation code

- Below 1 hour
- Below 3 hours
- Below 6 hours
- Below 12 hours
- Sonstiges:

« Zurück Weiter »

81 % abgeschlossen

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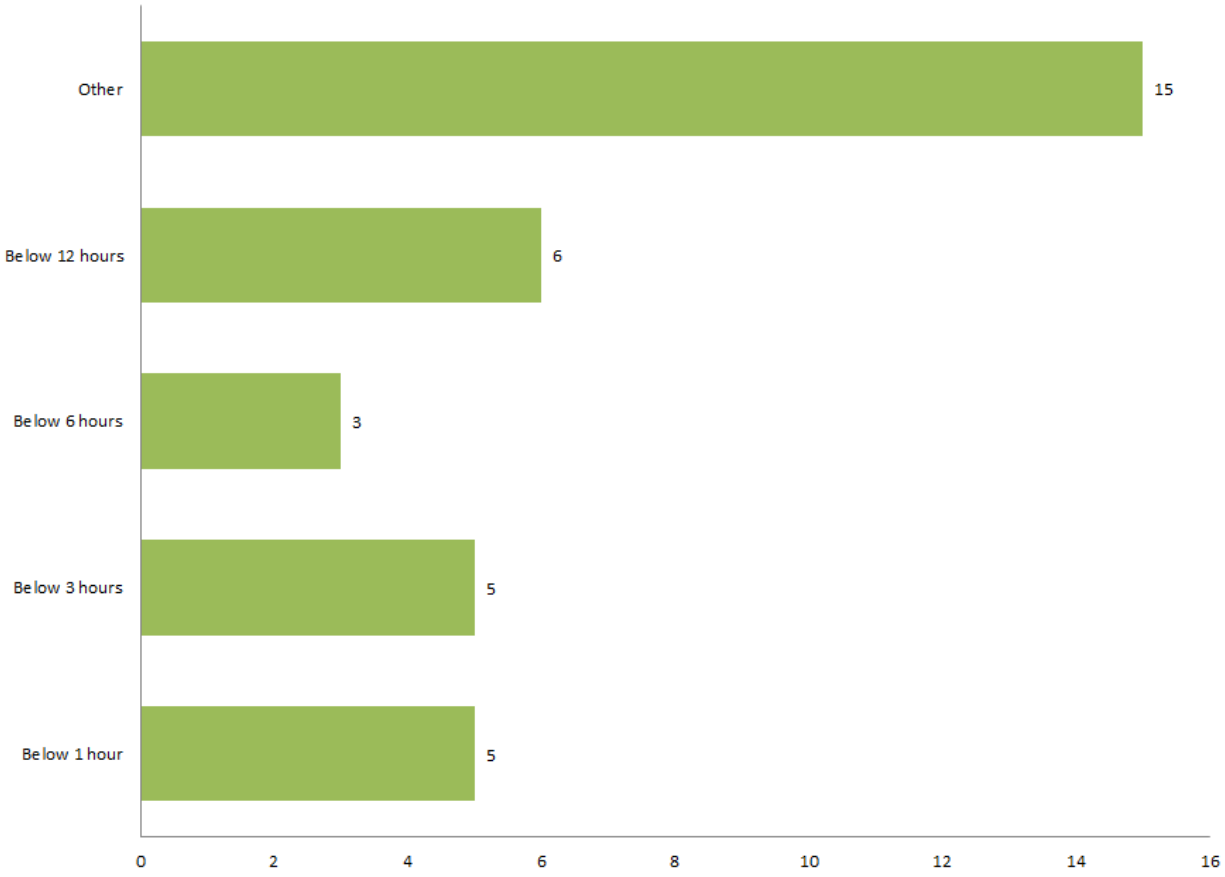
Missbrauch melden - Nutzungsbedingungen - Zusätzliche Bestimmungen


Other
15
Below 12 hours
6
Below 6 hours
3
Below 3 hours
5
Below 1 hour
5
0
2
4
6
8
10
12
14
16

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

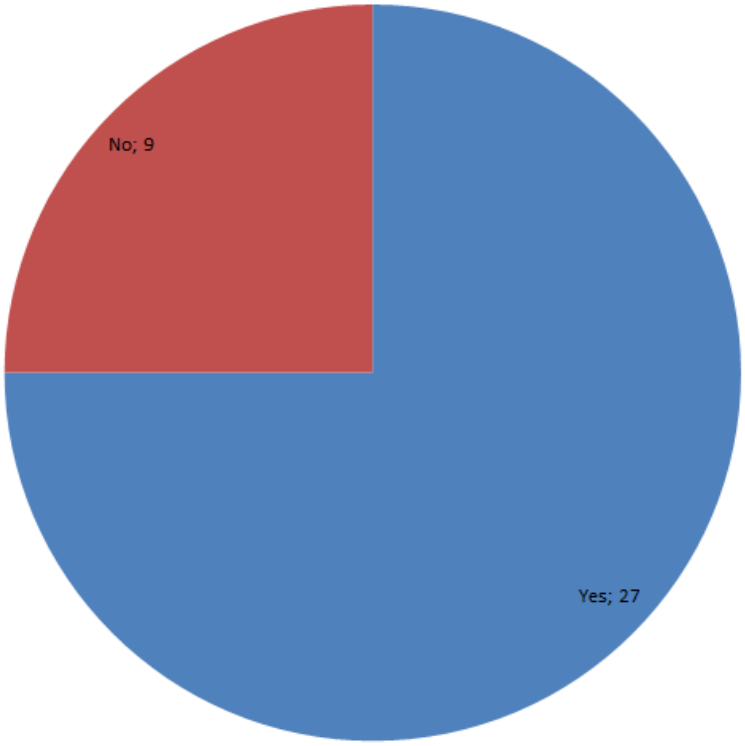
Access requirements

Is it possible to exchange the snow data used in your modeling environment with other groups *

- ( ) Yes
- ( ) No

« Zurück Weiter »

84 % abgeschlossen


No; 9
Yes; 27

Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Access requirements

Which access requirements exist for the snow observation data sets you are using? *

Examples: FTP access, GTS only, special data format

« Zurück Weiter »

86 % abgeschlossen

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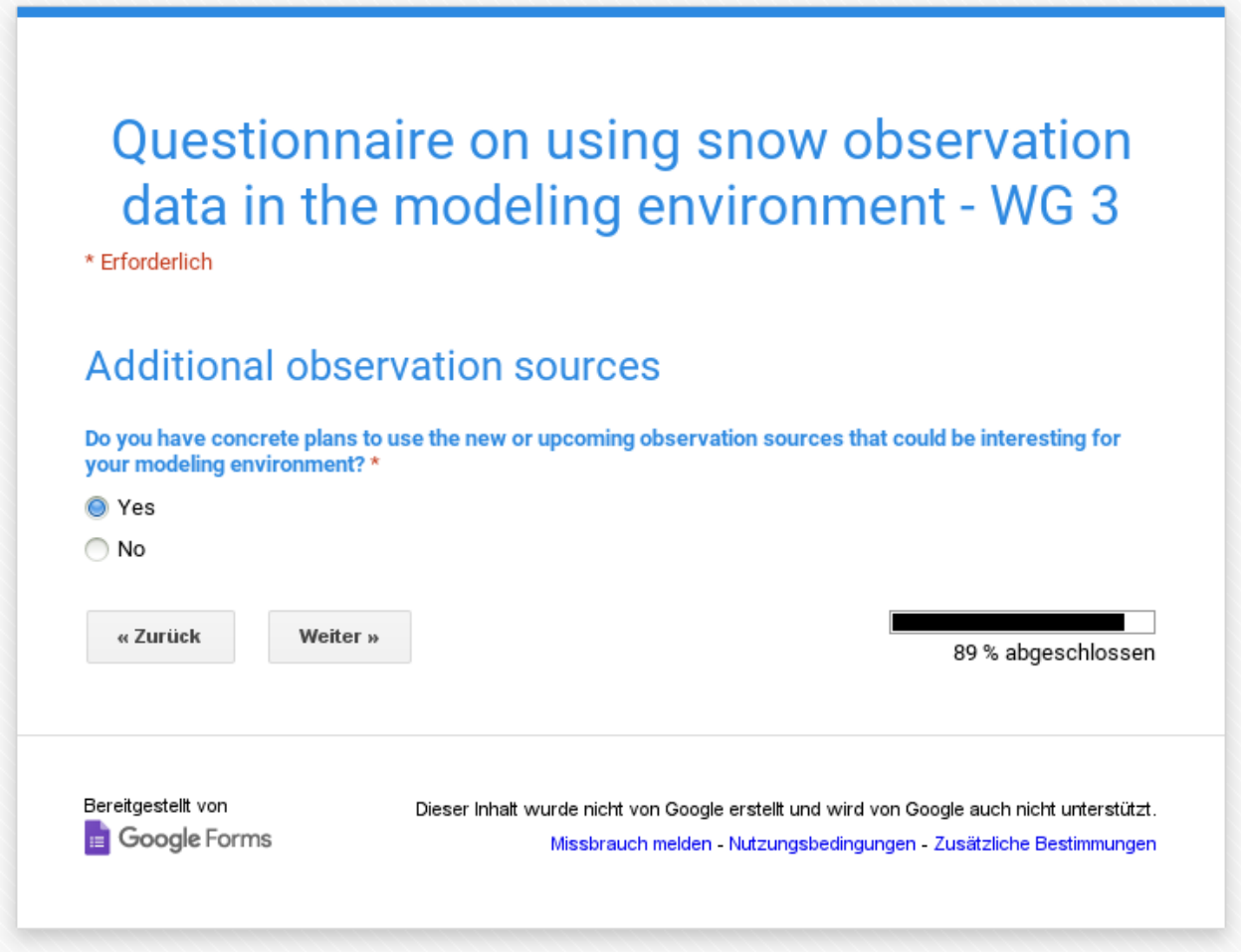
Missbrauch melden - Nutzungsbedingungen - Zusätzliche Bestimmungen

- GTS only
- FTP
- GTS
- FTP access, NetCDF, ASCII
- FTP from MODIS web site
- GTS only, data is already there for everyone to use.
- FTP access, GTS
- FTP access, data in GRIB2 format
- GTS, EUMETCast
- At that point, certain data is available on request. We use data from various sources / providers, so there is no simple answer to this question.
- They are provided to ECMWF.
- Mainly FTP (NSIDC)
- FTP access
- Web access, SFTP

- Exchange is possible in principle if we start using it.
- Special data format
- FTP access, GTS and other special data formats.
- We do not have automatic protocols for data exchange. Th eexchange is however possible after the discussion about conrete requirements.
- WMS
- Special Data format



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Additional observation sources

Do you have concrete plans to use the new or upcoming observation sources that could be interesting for your modeling environment? *

Yes

No

« Zurück Weiter »

89 % abgeschlossen

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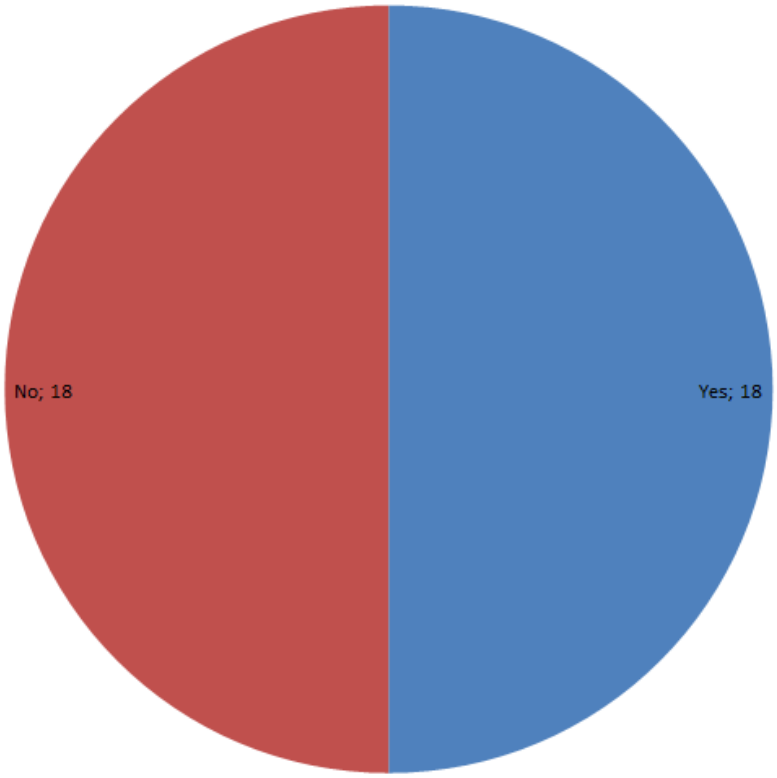
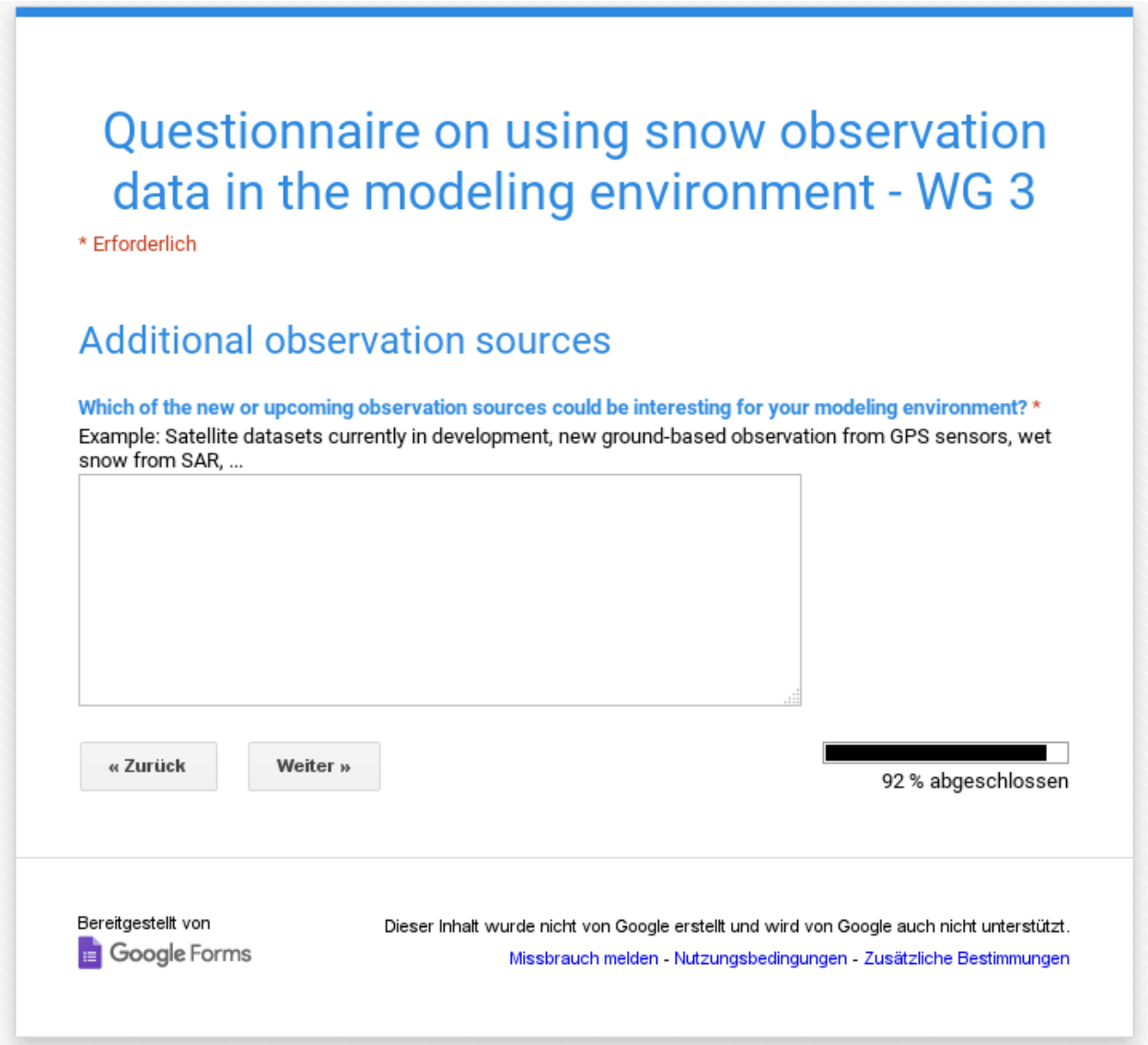
Missbrauch melden - Nutzungsbedingungen - Zusätzliche Bestimmungen


No; 18
Yes; 18



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Additional observation sources

Which of the new or upcoming observation sources could be interesting for your modeling environment? *

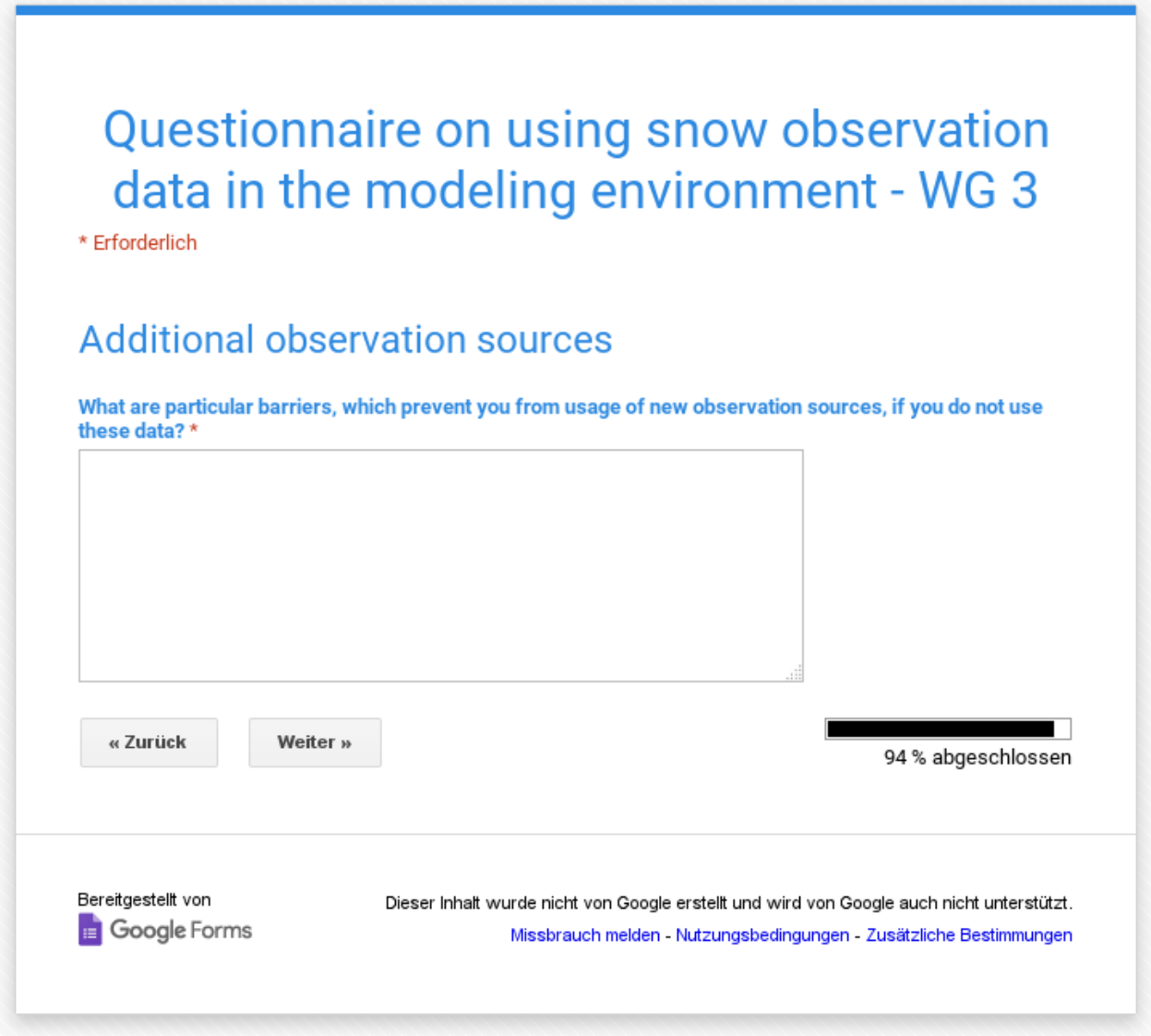
Example: Satellite datasets currently in development, new ground-based observation from GPS sensors, wet snow from SAR, ...

« Zurück Weiter »

92 % abgeschlossen

- Additional in situ data - Satellite datasets currently in development
- Sentinel products, in-situ SWE from GPS, snow liquid water and snow surface ground observations.
- Snow from SAR
- Satellite datasets currently in development, new ground-based observation from GPS sensors, wet snow from SAR
- Sentinel2
- SWE microwave satellite; snow cover optical and microwave satellite; (snow) albedo optical, microwave - still quite far from operational application but developed hopefully within the COST collaboration
- AMSR2, SAR
- Satellite datasets

- Plan to use ground-based observations of snow depth from non-SYNOP networks (in addition to SYNOP obs), where available on the GTS. Plan to assess AMSR-2 snow depth and SWE products for potential assimilation.
- Wet snow cover from SAR (sentinel-1)
- Snow microstructure measures from reflectance
- Satellite datasets in development, new ground-based observation from GPS sensors, wet snow from SAR,. etc-
- Satellite datasets currently in development
- Remote sensing of sc and swe
- Satellite datasets, and otehr observations that we couldn't use.
- Network of ground thermometers, GPS measurements, ground-based photogrammetry
- Data from Sentinel Satellite
- Ground-based obs.



Questionnaire on using snow observation data in the modeling environment - WG 3

* Erforderlich

Additional observation sources

What are particular barriers, which prevent you from usage of new observation sources, if you do not use these data? *

« Zurück Weiter »

94 % abgeschlossen

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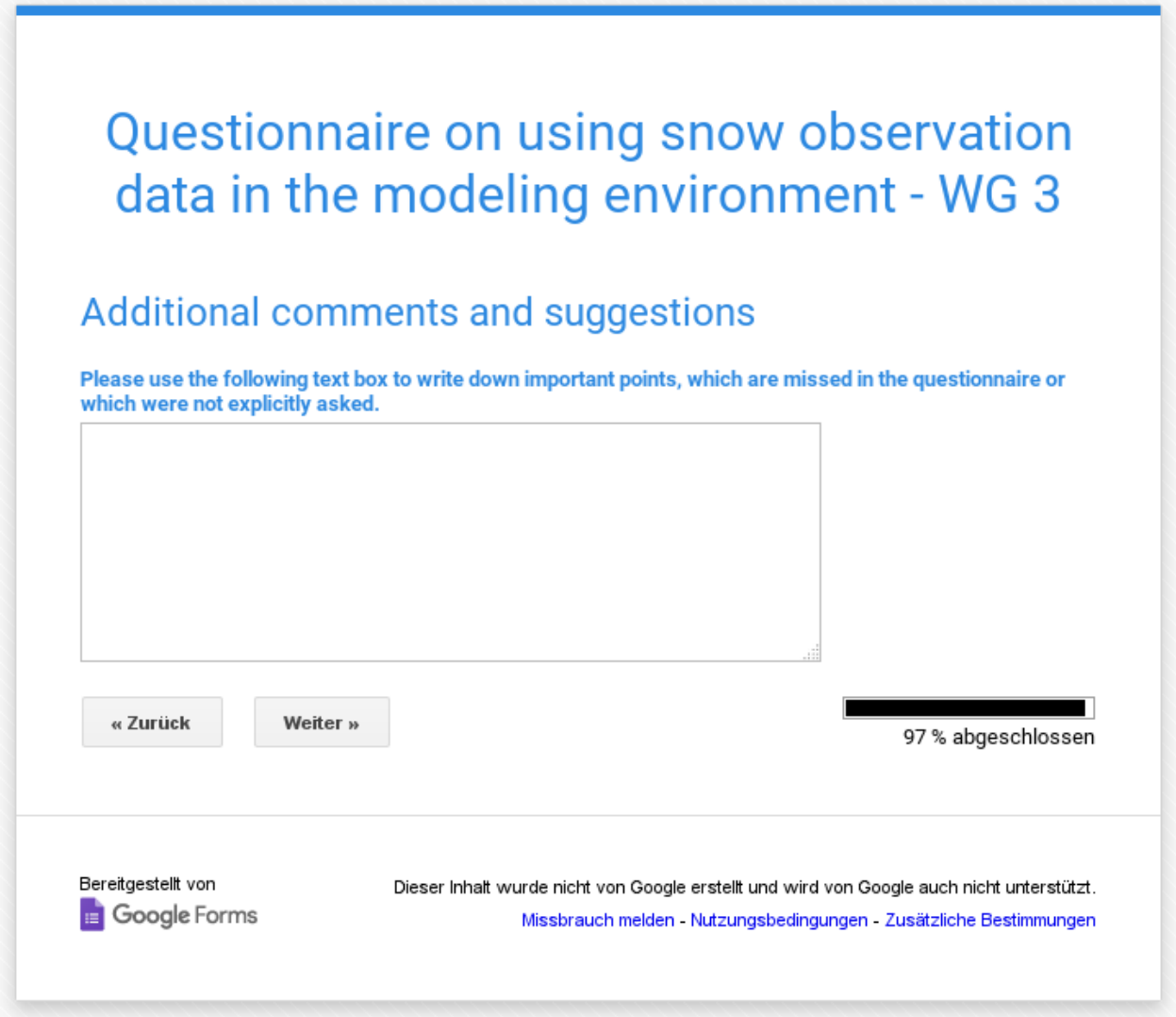
Missbrauch melden - Nutzungsbedingungen - Zusätzliche Bestimmungen

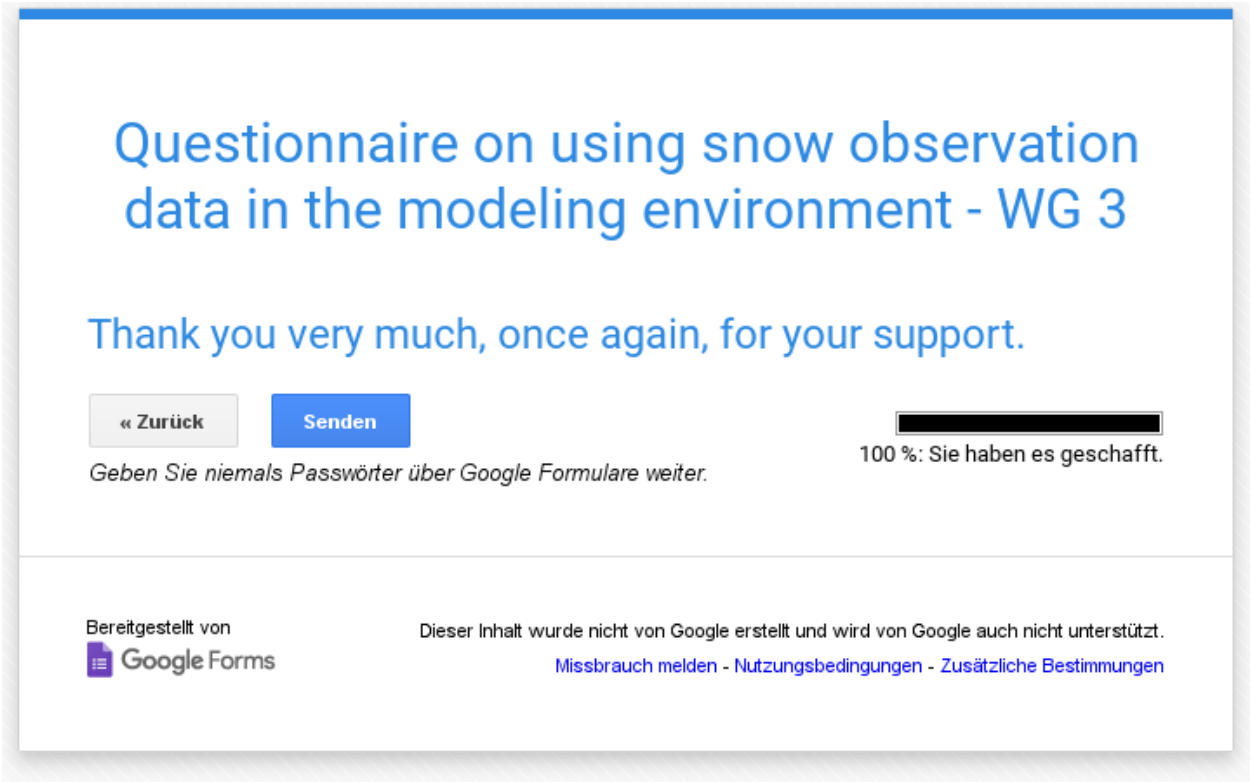
- None
- Data availability or Data quality
- Technology and accuracy for in-situ SWE observations still a big problem. time and financial ressources for snow surface temperature and snow liquid water content.
- Pricing
- Lack of manpower to do the development and implementation
- Time to evaluate the potential improvements and introduce the data with operational chain
- Available limited ressources for implementation into DA system, limited access to special snow measurement networks
- Data availability on the GTS
- The quality of operationally available remote sensing data (snow water equivalent) or the data availability itself (snow depth).
- Human ressources
- Non-SYNOP ground-based network snow depth observations are currently only exchanged on the GTS by a few countries. Obs need to be put on the GTS to be able to use them for data

assimilation in operational NWP systems. Active reporting of snow-free conditions (zero snow depth) is infrequent, in both SYNOP and other stations. This needs to change to enable the provision of a huge amount of additional data for use in NWP systems.

- Not yet an operational product, and temporal resolution not really sufficient until there are 2 platforms in operation. Our limited area snow DA is still in development so not ready to use new obs yet anyway. Anticipate 2 year timeframe.
- Time and funding
- Cost, complex access
- Our current focus is on enhancing our models / data assimiliation methodology; not on integrating more observational data into our system.
- Lack of human resources
- Lack of people who can work on it. There is for example a snow height Optimal Interpolation already available inside ALARO/AROME, but it needs new formulation of background error, tuning and testing, there is also NCEP free 1km snow product which could easily be used for yes/no decision, but some coding for interpolation and testing would be needed. Right now, there is no time to do that.
- Lack of information on possibilities to have access to other data and lack of information on which data.
- No particular
- New sources is not my main issue - my main issue is delays accessing in situ data e.g. Russian online snow survey data are not updated past 2011.
- Closed assimilation scheme, restricted to forecasting variables.
- No particular barriers
- We haven't got enough resources
- Human resources, lack of know-how.
- Limited development for Iceland of such products
- We just got this modeling system, we don't have much of the experience. organisation made the system as it is. But we would like to make it beter.
- Problems with data assimilation in existing systems and models. Knowledge about new data sources, formats, restriction etc.
- Presently only run limited area NWP model. In future, might run global model.
- We use the data in research/PhD projects, but not on a regular-long-term basis. i.e. many years of monitoring.
- Calibration/validation of data
- Difficulty getting to the data as a Research



- Collaboration in snow DA community. What kind of new snow observation data exist - information exchange with measurement community about new snow observation data
- See http://www.cosmo-model.org/content/model/documentation/core/cosmoAssim.pdf Further questions to jean-marie.bettems[at]meteoswiss.ch or martin.lange[at]dwd.de
- Chosing suitable methodology is very much linked to the availability of data, which in the case of snow data hugely differs from country to country. This is why collaboration between partners from different countries can be difficult.
- Status on snow observations based on satellite is at present not well known to us.
- No mechanism exists for real-time exchange of in situ SWE obs
- n/a
- None
- We are in principle interested to draw more attention on usage of snow observations in our modelling activities. However, the changes and developments are very slow due to lack of resources.
- Modeling system calculates snow depth so we jsut check it and corect if it needs to be corected.
- Appreciate the HarmoSnow Project. It will improves the NWP GCM and thus other downstream products in general.


Questionnaire on using snow observation data in the modeling environment - WG 3
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