ERA-CLIM2 WP3 Status Report

EUMST, FFCUL, FMI, METFR, METO, RIHMI, UNIBE

Delivered by Stefan Brönnimann

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Main tasks

- T3.1 - Data rescue for in-situ observations, quality control and metadata
- T3.2 - Satellite data rescue, reprocessing and inter-calibration
- T3.3 - Boundary constraints and external forcing

- Strong collaboration with WP4 (QC, comp

Status of Deliverables

Number	Description (Lead beneficiary)	Month
D3.1	Data catalogue (UBERN)	6
D3.2	Priorities for data rescue (UBERN)	6
D3.3	Meta-database update (UBERN)	48
D3.4	In-situ data for reanalysis (UBERN)	36
D3.5	In-situ data (other) (UBERN)	42
D3.6	Quality-controlled version of D3.4 (UBERN)	48
D3.7	Quality-controlled version of D3.5 (UBERN)	48
D3.8	RTTOV updates (METO)	36
D3.9	Early satellite data (METO)	37
D3.10	AVHRR polar winds (EUMST)	48
D3.11	SSM/T2 and AMSU-B/MHS radiance data (EUMST)	42
D3.12	Geostationary radiance data (EUMST)	42
D3.13	AMV from MFG (EUMST)	48
D3.14	Radio occultation data (EUMST)	48
D3.15	HadISST2 update (METO)	18
D3.16	Ice thickness data (METO)	12
D3.17	Ocean database update (METO)	24
D3.18	Snow data product (FMI)	42
D3.19	Quality controlled version of snow data base (in situ) (FMI)	48
D3.20	HadISD update (METO)	12

Status T3.1: Data Rescue Activities

- Imaging of high-priority sources completed
- Digitisation of high-priority sources >95%
- QC far advanced
- Continued effort: New sources are inventorised, imaged, digitised
- Continuation in other projects (METFR, UBERN, etc.)

Conclusion: On Track

FFCUL: Data Rescue Activities

- 100% of ca. 40K upper air station days imaged and digitised in ERA-CLIM1/2
- 100% of ca. 2.2M surface data station days imaged in ERA-CLIM1/2, 97% digitised

METFR: Data Rescue Activities

- METFR inventoried 643K station days of upper−air data, of which 246K high priorities. About 95% of high priorities is imaged, 85% of high priorities is digitised. The inventory is continuously enhanced and updated. QC of the data is ongoing.

RIHMI: Upper-Air Data Rescue Activities

- **RIHMI inventoried, imaged and digitized 100% of 390K profiles (9M variables) from 41 stations. RIHMI also completed the rescue of hourly meteorological data and of snow data.**

UBERN: Upper-Air Data Rescue Activities

- **100% of 754K station days finished (summer 2015).**

Met Office

- ACRE coordination (Rob Allan)
  - historical data rescue (e.g., East Russian/Alaskan region, Iran)
  - WMO/GFCS Initiatives

- Imaging historical Southern Ocean observations (Clive Wilkinson)
  - 80K images done, ca. 40K to be done (many new sources discovered)

T3.2 - Satellite data rescue, reprocessing and inter-calibration

Met Office

- D3.17: Development of HadIOD
  - surface and sub-surface ocean data - delivered
- D3.8: RTTOV (delivered)
- D3.9: Early satellite data (next week)

EUMST: Status Satellite Data Reprocessing

- D3.10: AVHRR winds: algorithm implemented and tested, processing in Q1/2017;
- D3.11: Microwave Sounder Radiances: Evaluation revealed needed change in inter-satellite calibration algorithm, updated algorithm expected in Q1/2017, delivery in Q2/2017;
- D3.12: Meteosat radiances: Re-calibration completed, images generation will be finished in Q1/2017, documentation and delivery in Q2/2017;
- D3.13: Meteosat Winds: Cloud analysis implemented, awaits new Meteosat images, processing in Q2-Q3/2017;
- D3.14: Radio Occultation Bending Angle Profiles: Metop-A GRAS completed but validation detected error that triggered full reprocessing which has been finished for Metop-A and B up to December 2015. COSMIC and CHAMP wave optics processing in Q2 and Q3/2017;
- All processing tasks were delayed due to availability of new EUMETSAT compute environment which only became available in mid October 2016.

EUMST: Summary

- Delays due to
  - much delayed installation of new compute environment
  -> production-scale processing is delayed
  -> storage not available
  - since Oct. 2016 the system works
  - detected errors (fortunately, data not processed yet…)
- Impacts
  - no WP directly depends on the deliverables
  (to be used for ERA-6)

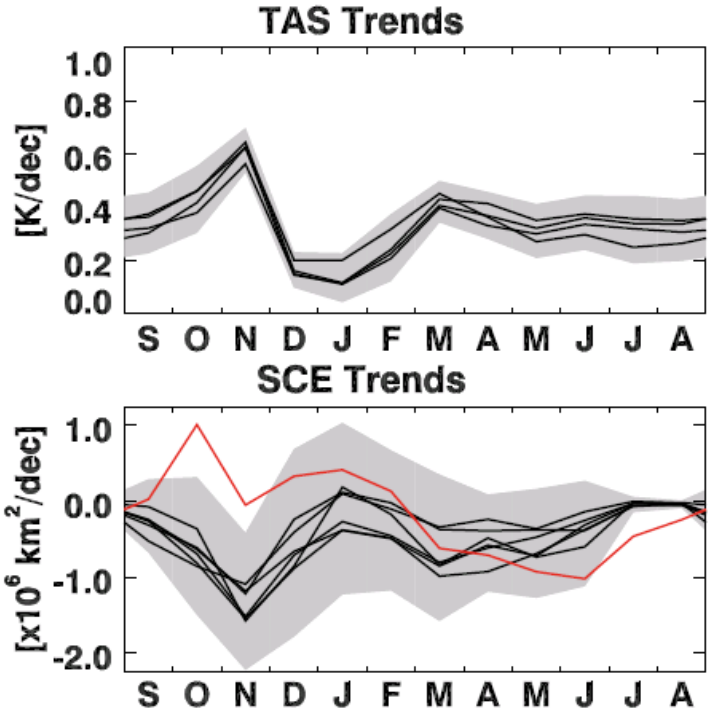
Task 3.3: Boundary constraints and external forcing

FMI

- Global estimates of snow extent and snow water equivalent (SWE) based on GlobSnow
- Development of a consolidated quality-controlled data base of in-situ snow observations in collaboration with NSIDC and RIHMI
- **Deliverables**
  - 3.18 Prototype snow data product (GlobSnow development product) for reanalysis **– delayed – no impact expected**
  - **3.19 Quality controlled version of snow data base (in situ) and snow data product (D3.18), first version released Apr 2016, update Sep 2016**

Influence of Observational Uncertainty on Determination of Trends 1981-2010

Monthly NH surface temperature trends from CRU, NCDC, GISS and NCEP2m



NOAA-CDR is outlier

Monthly NH snow cover trends from MERRA, ERA-I-Land, Crocus, GLDAS-2, Brown, GlobSnow, and NOAA

L. Mudryk, ECCC/CPS

WP3 Deliverables

- Some deliverables are late, no impacts expected
- Data work is “one cycle ahead” (production for ERA-6, etc.)
- “Passive monitoring” of observations, preliminary/ demonstration products (e.g. ERA-preSAT) evaluation (WP4)
- But necessary for any reanalysis service

Conferences and Activities since last GA

- EGU Sessions 2016/2017
- Organisation of conference: Observations for Re-analyses
  (22 June 2016, Maynooth, Ireland, together with ACRE meeting)
- Efforts to make data rescue sustainable across projects and services (C3S)
- New data rescue projects
- Publications (9 papers) / outreach (see following)

Demonstration case:
Extreme snow fall event and avalanches 1916

Extreme snow fall event and avalanches 1916

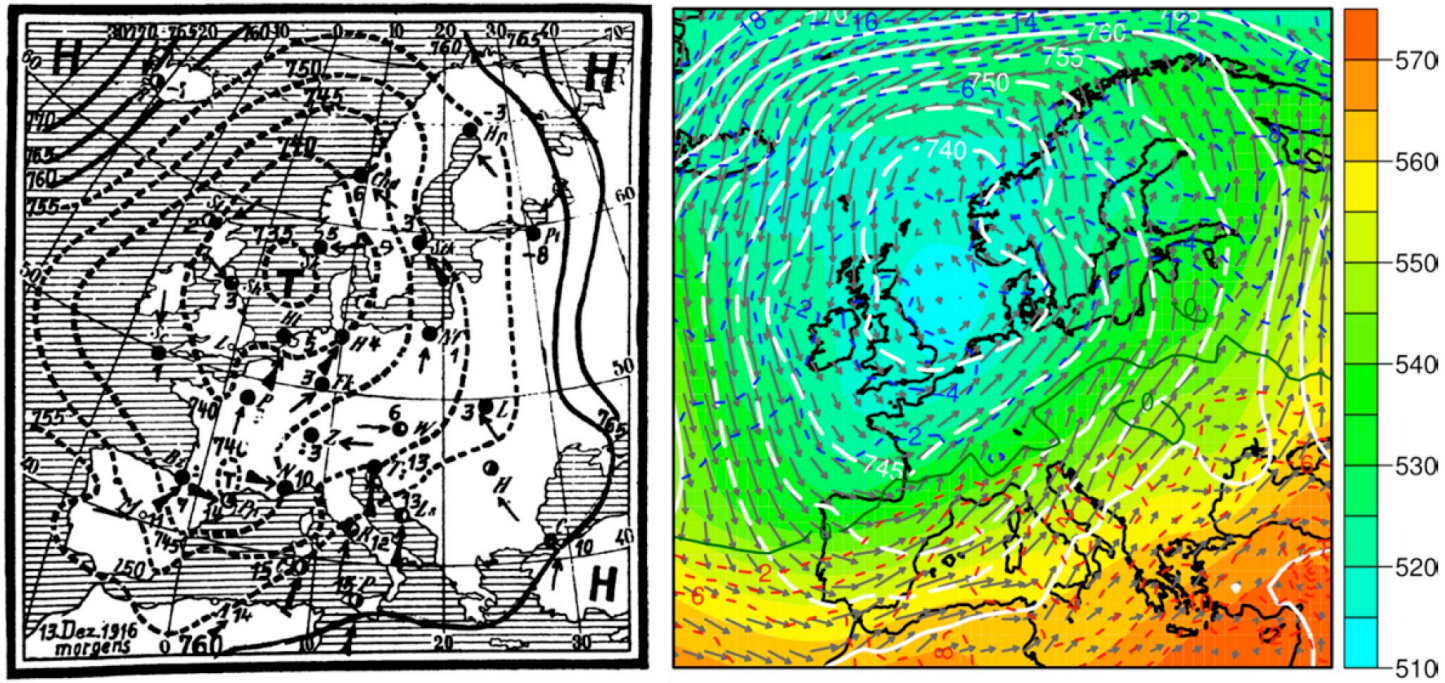
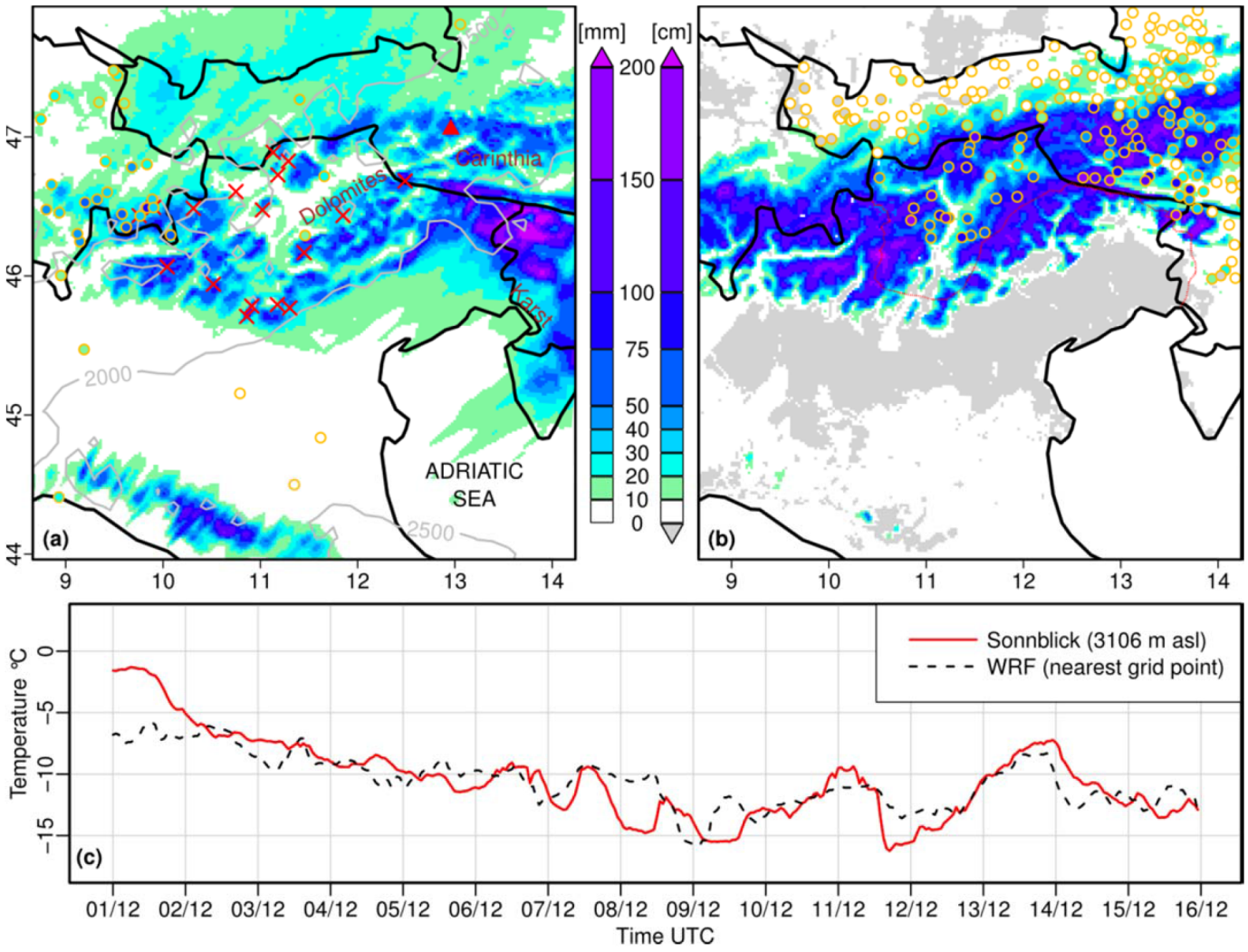


Figure 1. (left) Hand-drawn synoptic map of Europe for the morning of 13 December 1916[6], with black lines indicating sea level pressure (mmHg). Note that the map is based on unsynchronous observations spread over a few hours. (right) Synoptic map for 13 December 1916 at 06:00 UTC from ERA-20C reanalysis; white lines indicate sea level pressure (in mmHg for comparison), coloured lines (green for zero, red for positive, blue for negative values) and arrows indicate, respectively, temperature (°C) and wind at the isobaric level of 850 hPa (arrow length is proportional to wind speed), filled contours indicate geopotential height at 500 hPa (dam).

Extreme snow fall event and avalanches 1916



Outlook

- Deliverables D3.5/3.6/3.7
- Late EUMETSAT and FMI Deliverables
- Common WP3 data paper
- EGU 2017
- Continuation of data rescue beyond the project (new projects at METFR, UBERN), C3S activities, ERA-CLIM2-ACRE links (Rob Allan, Maynooth meeting)

Publications

- Bližňák, V., Valente, M. A. and Bethke, J. (2015) Homogenization of time series from Portugal and its former colonies for the period from the late 19th to the early 21st century. *Int. J. Climatol.,* **35:** 2400–2418. doi:10.1002/joc.4151
- Brönnimann S (2015) *Climatic Changes Since 1700.* Springer, Adv Global Change Res **55**, 375 pp.
- Brugnara Y et al (2015) A collection of sub-daily pressure and temperature observations for the early instrumental period with a focus on the “year without a summer” 1816. *Clim Past* **11:**1027-1047.
- Brugnara, Y., S. Brönnimann, M. Zamuriano, J. Schild, C. Rohr, D. Segesser (2016) December 1916: Deadly Wartime Weather. *Geographica Bernensia* **G91**. 8 pp. ISBN 978-3-905835-47-2, doi:10.4480/GB2016.G91.01 (also appeared in German and Italian)
- Hunziker, S., S. Gubler, J. M. Calle Fernandez, I. Moreno, M. F. Andrade, F. velarde, G. Carrasco, Y. Castellón, M. Croci-Maspoli, T. Konzelmann, M. Rohrer, and S. Brönnimann (2016) Identifying, attributing, and overcoming common data quality issues of manned station observations. *Int. J. Climatol.* (revised).

Publications

- Schmocker, J., H. P. Liniger, J N. Ngeru, Y. Brugnara, R. Auchmann, and S. Brönnimann (2016) Trends in mean and extreme precipitation in the Mount Kenya region from observations and reanalyses. *Int. J. Climatol.* **36,** 1500-1514.
- Stickler A et al (2015) Upper-air observations from the German Atlantic Expedition (1925–27) and comparison with the Twentieth Century and ERA-20C reanalyses. *Meteorol Z* **22:**349-358
- Thorne, P. et al. (2017) Towards an integrated set of surface meteorological observations for climate science and applications. *B. Amer. Meteorol. Soc*. (subimtted)
- Wegmann, M., Y. Orsolini, E. Dutra, O. Bulygina, A. Sterin, and S. Brönnimann (2016) Eurasian snow depth in long-term climate reanalyses, *The Cryosphere Discuss.,* doi:10.5194/tc-2016-253.