



World Meteorological Organization
Organisation météorologique mondiale

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Weather • Climate • Water
Temps • Climat • Eau

Form for Regular Reporting of CIMO Testbeds and Lead Centres

(expand the cells as required to properly reflect your activities)

Terms of Reference for CIMO Testbeds and Lead Centres are available under:
<http://www.wmo.int/pages/prog/www/IMOP/Testbeds-and-LC.html>

Name of Testbed / Lead Centre	Sodankylä Testbed for Cryosphere and Precipitation
Location of Testbed / Lead Centre	Sodankylä, Finland 67.36380°N 26.63040°E

Contact Person for the Testbed/Lead Centre	
Courtesy Title	Mr.
Family name	Ryyppö
First name	Timo
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Has contact person changed in last 2 years?	Yes
If yes, who was the previous contact person?	Osmo Aulamo

Report on Activities
Main activities that TB/LC carried out in the last 2 years for which results are already available: <ul style="list-style-type: none">• Comparison of RS92 and RS41 radiosondes within GRUAN network.

- O₃ and CFH soundings
- Columnar measurements of greenhouse gases from balloon-borne and ground based instruments.

Main activities that TB/LC carried out in the last 2 years for which results will soon be available:

- SPICE solid precipitation measurements
 - Title: Snow Water Equivalent Measurements during the WMO Solid Precipitation Intercomparison Experiment. Author(s): C. D. Smith, A. Kontu, R. Laffin, and J. Pomeroy MS No.: tc-2016-57 MS Type: Research article. Iteration: Initial Submission. Special Issue: The World Meteorological Organization Solid Precipitation InterComparison Experiment (WMO-SPICE) and its applications (AMT/ESSD/HESS/TC inter-journal SI)
 - Title: The World Meteorological Organization Solid Precipitation InterComparison Experiment (WMO-SPICE): Final Report".

Which guidance documents/standard procedures were developed during the last 2 years (please include full reference and web-link if available)?

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Which IOM reports / peer-reviewed publications were published in the last 2 years (please include full reference and web-link if available)?

- Survo P, Leblanc T, Kivi R, Jauhiainen H, Lehtinen R, Comparison of Selected In-situ and Remote Sensing Technologies for Atmospheric Humidity Measurement. In: 95th American Meteorological Society Annual Meeting, Phoenix, AZ, 2015
- Madonna F, Rosoldi M, Güldner J, Haefele A, Kivi R, Cadeddu M, Sisterson D, Pappalardo G, Quantifying the value of redundant measurements at GRUAN sites, *Atmos. Meas. Tech.*, 7, 3813-3823, 2014
- Dirksen R, Sommer M, Immler F, Hurst D, Kivi R, Vömel H, Reference quality upper-air measurements: GRUAN data processing for the Vaisala RS92 radiosonde, *Atmos. Meas. Tech.*, 7, 4463-4490, doi:10.5194/amt-7-4463-2014, 2014
- Barthlott, S., Schneider, M., Hase, F., Wiegeler, A., Christner, E., González, Y., Blumenstock, T., Dohe, S., García, O. E., Sepúlveda, E., Strong, K., Mendonca, J., Weaver, D., Palm, M., Deutscher, N. M., Warneke, T., Notholt, J., Lejeune, B., Mahieu, E., Jones, N., Griffith, D. W. T., Velasco, V. A., Smale, D., Robinson, J., Kivi, R., Heikkinen, P., and Raffalski, U.: Using XCO₂ retrievals for assessing the long-term consistency of NDACC/FTIR data sets, *Atmos. Meas. Tech.*, 8, 1555-1573, doi:10.5194/amt-8-1555-2015, 2015
- Deng, F., Jones, D. B. A., Henze, D. K., Bousserrez, N., Bowman, K. W., Fisher, J. B., Nassar, R., O'Dell, C., Wunch, D., Wennberg, P. O., Kort, E. A., Wofsy, S. C., Blumenstock, T., Deutscher, N. M., Griffith, D. W. T., Hase, F., Heikkinen, P., Sherlock, V., Strong, K., Sussmann, R., and Warneke, T.: Inferring regional sources and sinks of atmospheric CO₂ from GOSAT XCO₂ data, *Atmos. Chem. Phys.*, 14, 3703-3727, doi:10.5194/acp-14-3703-2014, 2014
- Lindqvist, H., O'Dell, C. W., Basu, S., Boesch, H., Chevallier, F., Deutscher, N., Feng, L., Fisher, B., Hase, F., Inoue, M., Kivi, R., Morino, I., Palmer, P. I., Parker, R., Schneider, M., Sussmann, R., and Yoshida, Y.: Does GOSAT capture the true seasonal cycle of carbon dioxide?, *Atmos. Chem. Phys.*, 15, 13023-13040, doi:10.5194/acp-15-13023-2015, 2015
- Feng, L., Palmer, P. I., Parker, R. J., Deutscher, N. M., Feist, D. G., Kivi, R., Morino, I., and Sussmann, R.: Estimates of European uptake of CO₂ inferred from GOSAT XCO₂ retrievals: sensitivity to measurement bias inside and outside Europe, *Atmos. Chem. Phys.*, 16, 1289-1302, doi:10.5194/acp-16-1289-2016, 2016
- Agustí-Panareda, A., Massart, S., Chevallier, F., Boussetta, S., Balsamo, G., Beljaars, A., Ciais, P., Deutscher, N. M., Engelen, R., Jones, L., Kivi, R., Paris, J.-D., Peuch, V.-H., Sherlock, V., Vermeulen, A. T., Wennberg, P. O., and Wunch, D.: Forecasting global atmospheric CO₂, *Atmos. Chem. Phys.*, 14, 11959-11983, doi:10.5194/acp-14-11959-2014, 2014
- Saad, K. M., Wunch, D., Toon, G. C., Bernath, P., Boone, C., Connor, B., Deutscher, N. M., Griffith, D. W.

T., Kivi, R., Notholt, J., Roehl, C., Schneider, M., Sherlock, V., and Wennberg, P. O.: Derivation of tropospheric methane from TCCON CH₄ and HF total column observations, Atmos. Meas. Tech., 7, 2907-2918, doi:10.5194/amt-7-2907-2014, 2014

Title(s) of IOM report(s) presently being developed by your Testbed/Lead Centre:
(please specify level of development: draft, ready for review, ...)

- Nordic report on weather station site classification. In preparation. To be presented on TECO 2016.

Has your Testbed/Lead Centre collaborated with one or more CIMO Expert Teams in developing guidance material? No

If yes, with which CIMO Expert Team(s)?

Capacity Building and Training Activities

Which capacity building/training activities have been carried out by the Testbed in the last 2 years?

- Extending the roof top area for instrumentation
- Purchase of 9 x 3.25 x 2.6 m container with temperature control for atmospheric gas column measurements

Has your testbed developed a twinning activity / special relationship with a companion station/site from a developing country? No

If yes, with which station/site?

Is your Testbed/Lead Centre making an oral/poster presentation at this year's TECO? Yes
(If yes, please specify Title(s) and Author(s) of the presentation(s))

- Several participants. Presentations not confirmed at the time of submitting the report.

Recent Changes in Circumstance

Have there been any recent changes in your Test Bed/Lead Centre's capabilities? If so, please specify:

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Have there been any recent changes in your Test Bed/Lead Centre's infrastructure? If so, please specify:

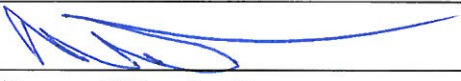
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Have there been any recent changes in your staffing? If so, please specify, and advise whether replacement staff have the required competencies:

- The point of contact has been changed. No impact for TB.
- Reduce of few people due to retirement and budget cuts. TB activities are carried out as nominal with current labor.

Future Plans	
What are your plans for the next two years?	
<ul style="list-style-type: none"> • Radiosonde testbed in Sodankylä • Participating GAW, GCW, GRUAN, TCCON and ICOS networks. • New ~50 m tower to be used f.ex. gas and flux measurements above and within canopy. • Purchase of a quadcopter with a spectrometer operating in the visible and infrared region 	
Is your Testbed/Lead Centre able to continue in the role of a Test Bed/Lead Centre during the coming two years?	Yes

Other relevant information (other activities of special interest to CIMO, etc...)
<ul style="list-style-type: none"> • New 7.3 m X-band satellite receiving system with S-band uplink by the end of 2016.

March 14, 2016	
Date	Name of Person Filling the Form