WMO OMM

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

World Meteorological Organization
Organisation météorologique mondiale
Organización Meteorológica Mundial
Всемирная метеорологическая организация
المنظمة العالمية للأرصاد الجوية
世界气象组织

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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:
ttp://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
Full Postal Address	Finnish Meteorological Institute Arctic Space Centre Tähteläntie 62 FI-99600 Sodankylä, Finland
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Email(s)	timo.ryyppo@fmi.fi
Has contact person changed in last 2 years?	No
If yes, who was the previous contact person?	

Report on Activities

Main activities that TB/LC carried out in the last 2 years for which results are already available:

- Most of the data is available from FMI databases
    - o http://litdb.fmi.fi/

- https://en.ilmatieteenlaitos.fi/open-data

- O_3 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:

- Title: The World Meteorological Organization Solid Precipitation InterComparison Experiment (WMO-SPICE): Final Report". (Expected Summer 2018)
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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)?

- Title: Retrieval of effective correlation length and Snow Water Equivalent from radar and passive microwave measurements. Author(s): J. Lemmetyinen, C. Derksen, H. Rott, G. Macelloni, J. King, M. Schneebeli, A. Wiesmann, L. Leppänen, A. Kontu, and J. Pulliainen, Remote Sensing, 10.2: 170, 2018.
- Title: An assessment of two automated snow water equivalent instruments during the WMO Solid Precipitation Intercomparison Experiment: Author(s): Smith C, Kontu A, Laffin R, Pomeroy J. Cryosphere, vol. 11, no. 1, pp. 101-116, 2017
- Title: Coupling SNOWPACK-modeled grain size parameters with the HUT snow emission model. Authors(s): Kontu A, Lemmetyinen J, Vehviläinen J, Leppänen L, Pulliainen J. Remote Sensing of Environment, vol. 194, pp. 33-47, 2017
- Title: Measuring winter precipitation and snow on the ground in northern polar regions. Author(s): Janowicz J. R., Stuefer S. L., Sand K., Leppänen L. Hydrology Research, nh2017059, DOI: 10.2166/nh.2017.059, 2017
- Title: Microstructure representation of snow in coupled snowpack and microwave emission models. Author(s): Sandells M, Essery R, Rutter N, Wake L, Leppänen L, Lemmetyinen J. Cryosphere, 11, 1, 229-246, DOI: 10.5194/tc-11-229-2017, 2017
- Title: Spatial and temporal variation of bulk snow properties in northern boreal and tundra environments based on extensive field measurements. Author(s): Hannula, H. R., Lemmetyinen, J., Kontu, A., Derksen, C., and Pulliainen, J. Geoscientific Instrumentation, Methods and Data Systems, 5(2), 347-363, 2016
- Title: Arctic Snow Microstructure Experiment for the development of snow emission modelling. Author(s): Maslanka W, Leppänen L, Kontu A, Sandells M, Lemmetyinen J, Schneebeli M, Proksch M, Matzl M, Hannula H, Gurney R. Geoscientific Instrumentation, Methods and Data Systems 5, 85-94, 2016
- Title: Sodankylä manual snow survey program. Author(s): Leppänen L, Kontu A, Hannula H, Sjöblom H, Pulliainen J. Geoscientific Instrumentation, Methods and Data Systems 5, 163-179, 2016
- Title: Comparisons of the Orbiting Carbon Observatory-2 (OCO-2) $X_\chemCO_2$ measurements with TCCON: Author(s): Wunch D, Wennberg P.O, Osterman G, Fisher B, Naylor B, Roehl C.M, O?Dell C, Mandrake L, Viatte C, Kiel M, Griffith D.W, Deutscher N.M, Velazco V.A, Notholt J, Warneke T, Petri C, Maziere M.D, Sha M.K, Sussmann R, Rettinger M, Pollard D, Robinson J, Morino I, Uchino O, Hase F, Blumenstock T, Feist D.G, Arnold S.G, Strong K, Mendonca J, Kivi R, Heikkinen P, Iraci L, Podolske J, Hillyard P.W, Kawakami S, Dubey M.K, Parker H.A, Sepulveda E, García O.E, Te Y, Jeseck P, Gunson M.R, Crisp D, Eldering A. Atmospheric Measurement Techniques Vol. 10 p. 2209-2238. https://www.atmos-meas-tech.net/10/2209/2017/ doi: 10.5194/amt-10-2209-2017, 2017.
- Title: Consistent regional fluxes of CH$_4$ and CO$_2$ inferred from GOSAT proxy XCH$_4$\,:\,XCO$_2$ retrievals, 2010?2014. Author(s): Feng L, Palmer P.I, Bösch H, Parker R.J, Webb A.J, Correia C.S, Deutscher N.M, Domingues L.G, Feist D.G, Gatti L.V, Gloor E, Hase F, Kivi R, Liu Y,

Miller J.B, Morino I, Sussmann R, Strong K, Uchino O, Wang J, Zahn A. Atmospheric Chemistry and Physics Vol. 17 p. 4781-4797. https://www.atmos-chem-phys.net/17/4781/2017/ doi: 10.5194/acp-17-4781-2017, 2017

- Title: Methods to homogenize electrochemical concentration cell (ECC) ozonesonde measurements across changes in sensing solution concentration or ozonesonde manufacturer.Author(s): Deshler T, Stübi R, Schmidlin F, Mercer J, Smit H, Johnson B, Kivi R, Nardi B. Atmos. Meas. Tech., 10, 2021-2043, https://doi.org/10.5194/amt-10-2021-2017, 2017
- Title: U. S.: Trends and annual cycles in soundings of Arctic tropospheric ozone. Author(s): Christiansen, B., Jepsen, N., Kivi, R., Hansen, G., Larsen, N., and Korsholm. Atmos. Chem. Phys., 17, 9347-9364, https://doi.org/10.5194/acp-17-9347-2017, 2017.
- Title: Fourier transform spectrometer measurements of column CO2 at Sodankylä, Finland. Author(s): Kivi, R. and Heikkinen, P. Geosci. Instrum. Method. Data Syst., 5, 271-279, https://doi.org/10.5194/gi-5-271-2016, 2016.

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

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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?

- 24 m height steel tower to equip flux measurement devices and later radiometers, scatterometer and hyperspectral camera
- 7.3 m X-band satellite reception system with S-band up/downlink capability
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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 / No
(If yes, please specify Title(s) and Author(s) of the presentation(s))

- Possible 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:

-
-

Future Plans

What are your plans for the next two years?

- Build a measurement raft to host flux measurement devices on campaign basis
- Host several campaigns involving international guests and partners
- Participating GAW, GCW, GRUAN, TCCON and ICOS networks.

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.)

- One of the INTERACT stations (https://eu-interact.org/field-sites/pallas-sodankyla-stations/)

15.2.2018 — **Date**

Timo Ryyppö — **Name of Person Filling the Form**