



CEOS Intercalibration of Ground-Based Spectrometers and Lidars

Minispectrometer Intercalibration and Satellite Validation

Report 1: List of minispectrometers considered in this activity

Contents

| | | |
|-----|-------------------------------------------------------------|---|
| 1 | Introduction | 3 |
| 1.1 | Reference Documents | 3 |
| 1.2 | Definitions, Acronyms, and Abbreviations | 3 |
| 2 | List of minispectrometers considered in this activity | 4 |

Document Change Record

| Version | Date | Page | Observations |
|---------|------------|------|-----------------------|
| 1 | 2013-04-04 | All | First draft version |
| 2 | 2013-04-05 | All | Homogenize formatting |

1 Introduction

This report is deliverable D1 of the project [RD1, RD2].

1.1 Reference Documents

| No | Description |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RD1 | Inter-calibration of ground-based spectrometers and Lidars – Minispectrometer Intercalibration and Satellite Validation [Statement of Work], Issue 1, Revision 0, GMES-CLVL-EOPG-SW-13-0001, 15 January 2013 |
| RD2 | Inter-calibration of ground-based spectrometers and Lidars – Minispectrometer Intercalibration and Satellite Validation [Proposal], Contract: 22202/09/I-EC, RFQ/3-12340/08/I-EC, 22 January 2013 |

1.2 Definitions, Acronyms, and Abbreviations

| No | Description |
|---------|-------------------------|
| ENVISAT | Environmental satellite |

2 List of minispectrometers considered in this activity

LuftBlick has collected and stored a total of 8547 daily Pandora Level 1 files (=raw data files) from 47 different locations. The owners of these data have agreed to the analysis of the material within this project. A list of the locations is given in table 1.

Figure 1 shows the time periods covered at each location. Blue dots indicate that one Pandora-instrument was operating, green dots mean that between two and five Pandoras were operating, and red dots mean that more than five Pandoras were operating simultaneously at one location.

The data-base includes 4894 daily files before 8 April 2012 (the last date of available ENVISAT data) and 3653 daily files after 8 April 2012. Defining a "site-day" as a day, where at least one Pandora was measuring at a given location, i.e. days with multiple instruments on one site count as one site-day, we have 2858 site-days before 8 April 2012 and 2693 site-days after 8 April 2012.

Table 1: Measurement sites with available Pandora measurements; the “Short name” is used for figure 1.

| Short name | Long name | Country | Latitude [-90°, 90°] | Longitude [-180°, 180°] | Altitude [m.a.s.l.] | Pandora number |
|---------------|-----------------------------------------|-------------|----------------------|-------------------------|---------------------|-----------------------------------|
| Aldino | Aldino (Maryland) | USA | 39.56333 | -76.20389 | 128 | 23 |
| Arvin | Arvin (California) | USA | 35.23910 | -118.78870 | 158 | 35 |
| Bakersfield | Bakersfield (California) | USA | 35.32460 | -118.99760 | 115 | 33, 36 |
| Beltsville | Howard University Beltsville Laboratory | USA | 39.05528 | -76.87833 | 73 | 2, 20 |
| Busan | Busan/South Korea | SOUTH KOREA | 35.23530 | 129.08250 | 228 | 20 |
| Cabauw | Cabauw | NETHERLANDS | 51.97040 | 4.92625 | 0 | 3, 9 |
| ChesapeakeBay | Chesapeake Bay NOAA/Boat | USA | 38.98401 | -76.46727 | 12 | 24 |
| Corcoran | Corcoran (California) | USA | 36.10220 | -119.56560 | 60 | 34 |
| DC3 | Salina | USA | 38.47460 | -97.38550 | 388 | 17 |
| Dorsey | Dorsey Rock Farm | USA | 39.26630 | -77.02580 | 200 | 9 |
| Edgewood | Edgewood Chemical Biological Center | USA | 39.41000 | -76.29667 | 9 | 8, 18 |
| Essex | Essex (Maryland) | USA | 39.31083 | -76.47444 | 12 | 19 |
| FMI | FMI/Helsinki | FINLAND | 60.20370 | 24.96120 | 97 | 21 |
| FSU | Frostburg State University | USA | 39.65110 | -78.93290 | 567 | 2, 3, 8, 9 |
| Fairbanks | Fairbanks | USA | 64.86000 | -147.85000 | 510 | 2, 9 |
| Fairhill | Fairhill (Maryland) | USA | 39.70111 | -75.86800 | 118 | 16, 24 |
| FourCornersNM | Los Alamos D.O.E | USA | 36.79700 | -108.48000 | 1639 | 23 |
| Fresno | Fresno Garland (California) | USA | 36.78540 | -119.77310 | 95 | 30, 31 |
| GSFC | Goddard Space Flight Center | USA | 38.99260 | -76.83960 | 90 | 1, 2, 3, 6, ..., 9, 16, ... , 37, |

| | | | | | | |
|---------------|-----------------------------------------------|--------------|-----------|------------|------|----------|
| | | | | | | 101 |
| Hanford | Hanford (California) | USA | 36.31930 | -119.64330 | 80 | 18, 32 |
| Huron | Huron (California) | USA | 36.20600 | -120.10500 | 60 | 2 |
| IZO | Izana Atmospheric Research Center | SPAIN | 28.30900 | -16.49940 | 2360 | 101 |
| Langley | Langley Research Center | USA | 37.10360 | -76.38680 | 4 | 3, 6 ,37 |
| Lauder | Lauder | NEW ZEALAND | -45.03800 | 169.68400 | 370 | 37 |
| Madera | Madera City (California) | USA | 36.95330 | -120.03420 | 77 | 29 |
| NASAHQ | National Aeronautics and Space Administration | USA | 38.88200 | -77.01000 | 28 | 17 |
| NCU | National Central University (Lulin) | TAIWAN | 23.46861 | 120.87361 | 2868 | 102 |
| Oldtown | Baltimore/Oldtown (Maryland) | USA | 39.29149 | -76.59646 | 120 | 9 |
| PSU | Pennsylvania State University | USA | 40.79317 | -77.86677 | 391 | 8 |
| Padonia | Padonia Elementary School | USA | 39.46083 | -76.63111 | 120 | 17 |
| Parlier | Parlier (California) | USA | 36.59740 | -119.50370 | 108 | 28 |
| Penang | USM Penang | MALAYSIA | 5.35800 | 100.30200 | 181 | 18 |
| Porterville | Porterville (California) | USA | 36.03179 | -119.05500 | 141 | 8, 27 |
| Potchefstroom | Welgegund | SOUTH AFRIKA | -25.91120 | 28.21031 | 1523 | 8 |
| RI | ECOMon/NOAA-boat | USA | 41.53000 | -71.30000 | 90 | 24 |
| SZO | CIAI Santa Cruz de Tenerife | SPAIN | 28.47250 | -16.24740 | 52 | 101 |
| SERC | Smithsonian Environmental Research Center | USA | 38.88000 | -76.55000 | 90 | 7, 27 |

| | | | | | | |
|-------------|-----------------------------------------|-------------|----------|------------|-----|----|
| Seoul | Yonsei University/Seoul | SOUTH KOREA | 37.56440 | 126.93400 | 181 | 19 |
| Shafter | Shafter (California) | USA | 35.50350 | -119.27264 | 109 | 9 |
| Singapore | Singapore | SINGAPORE | 1.28000 | 101.77000 | 22 | 9 |
| Tranquility | Tranquility (California) | USA | 36.63410 | -120.38240 | 50 | 26 |
| UHMT | University of Houston Moody Tower | USA | 29.71800 | -95.34100 | 64 | 25 |
| UMBC | University Of Maryland Baltimore County | USA | 39.25470 | -76.70916 | 73 | 2 |
| UMCP | University Of Maryland College Park | USA | 38.99091 | -76.94252 | 73 | 21 |
| USNA | Naval Academy (Annapolis Maryland) | USA | 38.98367 | -76.47956 | 160 | 25 |
| Utapao | Thailand | THAILAND | 39.41000 | -76.29667 | 9 | 8 |
| Visalia | Visalia (California) | USA | 36.31410 | -119.39300 | 90 | 18 |

Next page:

Figure 1: Time coverage of Pandoras

