Japanese activities in observation during the YOPP period

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Outline:

- A report of observations made by the JARE (Japanese Antarctic Research Expedition) during the YOPP-SH.

- Pre-YOPP-SH activity using a data assimilation system and inland radiosonde observations at Dome Fuji.

References:

Japanese observation sites for YOPP-SH

- Dome Fuji: Radiosonde, AWS
- Relay Point: AWS
- H128: AWS
- Syowa: Radiosonde
- Shirase: Radiosonde

Jun Inoue (NIPR, Japan)
<table>
<thead>
<tr>
<th>Station</th>
<th>Instrument</th>
<th>Frequency</th>
<th>Period</th>
<th>Ordinal state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syowa</td>
<td>Radiosonde*1</td>
<td>4 times daily</td>
<td>16 Nov. 2018 – 15 Feb. 2019</td>
<td>Twice daily</td>
</tr>
<tr>
<td>Dome F</td>
<td>Radiosonde*2</td>
<td>Twice daily</td>
<td>12 – 31 Dec. 2018</td>
<td>None</td>
</tr>
<tr>
<td>Relay point</td>
<td>AWS*4</td>
<td>3 hourly</td>
<td>28 Nov. 2018 – 15 Feb. 2019</td>
<td>3 hourly Since Nov. 2018</td>
</tr>
<tr>
<td>Shirase (ship)</td>
<td>Radiosonde*3</td>
<td>Twice daily</td>
<td>3 – 17 Feb. 2019</td>
<td>By project</td>
</tr>
</tbody>
</table>

Transferred elements:
*1 : TTAA, TTBB, TTCC, TTDD (for registered station)
*2 : IIAA, IIBB, IICC, IIDD (for mobile)
*3 : UUAA, UUBB, UUCC, UUDD (for ship)
*4 : Pressure, Temperature, R. humidity, Wind sp., Wind dir.
<table>
<thead>
<tr>
<th>Station</th>
<th>Additional launches succeeded in going to GTS</th>
<th>Period</th>
<th>Ordinal state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dome Fuji</td>
<td>33 launches</td>
<td>12 – 31 Dec. 2018</td>
<td>None</td>
</tr>
<tr>
<td>Shirase (ship)</td>
<td>2 launches</td>
<td>3 – 17 Feb. 2019</td>
<td>None</td>
</tr>
</tbody>
</table>

Report in low-level BUFR files but not in PREPBUFR files
- Report in GDAS PREPBUFR file but not in GFS PREPBUFR file
- 89002 : 358 : NEUMAYER / GERMANY STTN
- 89009 : 214 : AMUNDSEN-SCOTT / U.S.A. STTN
- 89022 : 109 : HALLEY / U. KINGDOM STTN
- 89055 : 015 : BASE MARAMBIO (CENTRO MET. ANTARTICO) / A
- 89056 : 081 : CENTRO MET. ANTARTICO PDTE. EDUARDO FREI
- 89602 : 106 : ROTHERA POINT / U. KINGDOM STTN
- 89532 : 216 : SYOWA / JAPAN STTN
- 89564 : 115 : MAWSON / AUSTRALIA STTN
- 89571 : 231 : DAVIS / AUSTRALIA STTN
- 89573 : 000 : ZHONGSHAN WEATHER OFFICE / CHINA STTN
- 89592 : 211 : MIRNYJ / RUSSIAN FEDERATION STTN
- 89611 : 236 : CASEY / AUSTRALIA STTN
- 89625 : 234 : CONCORDIA / ITALY STTN
- 89642 : 290 : DUMONT D’URVILLE / FRANCE STTN
- 89662 : 233 : BASE BAIA TERRA NOVA / ITALY STTN
- 89664 : 216 : MCMURDO / U.S.A. STTN
- 89859 : 000 : JANG BOGO (KOREA)
- 94598 : 330 : MACQUARIE ISLAND / AUSTRALIA (ADDITIONAL)
- DILK : 180 : Polarstern
- HTXUH4H : 001 : HTXUH4H
- JSNJ : 000 : SHIRASE
- MOBL : 000 : DOME FUJI / JAPAN STTN
- WDK3BH5 : 021 : WDK3BH5
- WSD : 008 : WAIS DIVIDE

Syowa
Shirase
Dome Fuji
OSEs for Dec 2018 using JAMSTEC’s DA system

Mean Z300 spred (CTL - OSE),
Mean WS300, Z300 (CTL) & Sonde points
[12/DEC - 31/DEC/2018]
### Additional observations before YOPP-SH

<table>
<thead>
<tr>
<th>Station</th>
<th>Instrument</th>
<th>Frequency</th>
<th>Period</th>
<th>GTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dome Fuji</td>
<td>Radiosonde</td>
<td>Twice daily</td>
<td>19 – 29 Dec. 2017</td>
<td>23 launches</td>
</tr>
<tr>
<td>Relay point to S16</td>
<td>Radiosonde</td>
<td>Twice daily</td>
<td>1 – 12 Oct. 2018</td>
<td>None</td>
</tr>
<tr>
<td>Shirase (ship)</td>
<td>Radiosonde</td>
<td>Twice daily</td>
<td>14 – 19 Dec. 2017</td>
<td>None</td>
</tr>
</tbody>
</table>

**Wind speed at Syowa station during January 2018**

- **Instantaneous max. WS**
- **Averaged max. WS**
- **Averaged WS**

*From JMA*
Difference in the data use among operational centers

ECMWF assimilates TEMP Mobile (Dome Fuji: DF)
JMA does not assimilate it (JMA personal comm.)
Impact radiosondes on forecast skill of a cyclone

- ECMWF (w/ DF) well predicted the deepening of the central pressure
- JMA (w/o DF) did not predict it

Difference in observations used in data assimilation in initial fields?

Using an independent model, the impact of the DF data was evaluated by OSEs.

- OSEf (w/ DF) well predicted it
- CTLf (w/o DF) did not predict it

Similar characteristics to the operational one

- T250 was well corrected in OSE (w/ DF)
- The observational signal traveled over the large ensemble spread region, contributing to the forecast skill of the cyclone near the Syowa.

Summary

• The Japanese contributions to the YOOPP-SH with GTS data transfer at Syowa, Dome Fuji, and RV Shirase
  ➢ JAMSTEC DA system will be used
  ➢ Japan Meteorological Agency (JMA) is also interested in OSEs using JMA’s DA system

• The pre-YOOPP-SH activity using a DA system showed that the observations at Dome Fuji improved the forecast skill of an extreme event near the coastal area
  ➢ Need to check if the Dome Fuji data is assimilated into a system at each weather center before OSEs are planned

References: