KOPRI-SH

Investigation for the Cause of East-West Different Climate Responses in Antarctica

Principal investigator

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Areas of contribution

Polar atmospheric processes

Observations

Summary

This project is funded by KOPRI for the period 2017-2019 with the goal of understanding the role of atmospheric processes in the east-west climate differences in Antarctica. The three main research themes are: 1) sensitivity of Antarctic climate to a change in external forcing; 2) atmospheric processes in the Pacific sector of Antarctica through in-situ observation and synoptic scale numerical simulations; and 3) the relationship between biogenic dimethylsulfide (DMS) and aerosol particle formation in the Antarctic atmosphere.

Description

This project is funded by KOPRI for three years from 2017 with the goal of understanding the role of atmospheric processes in the east-west climate differences in Antarctica. For this goal, the project is composed of three components.
The first part is to investigate the sensitivity of Antarctic climate to a change in external forcing. For this objective, we examine the role of atmosphere circulation changes on the regional differences in sea ice distribution and surface temperature. Also, we investigate the change in the Southern Hemisphere westerly jet in its strength and position to a change in external forcing.

The second part is to characterize atmospheric processes in the Pacific sector of Antarctica through in-situ observation and synoptic scale numerical simulations. For this, we analyze synoptic-scale phenomena around our Antarctic stations using regional-scale numerical simulations. Besides of numerical modeling, we have been conducting surface meteorological observations at the King Sejong station (KSJ) and Jang Bogo (JBG) station. Furthermore, we plan to enhance observational activities by radiosonde sounding at KSJ and JBG during the Special Observing Period (SOP) of YOPP-SH.

The third part, which is not directly related to YOPP, is to investigate the relationship between biogenic dimethylsulfide (DMS) and aerosol particle formation in the Antarctic atmosphere. The activities includes continuous observation of the physio-chemical property of aerosol particles and estimation of the influence of warming events on the production of biogenic aerosol.

We have considered the YOPP-SH when preparing the proposal of this project, so that our project and YOPP-SH can benefit mutually. By contributing to YOPP-SH activities, we expect our understanding of the Antarctic climate system will be enhanced and numerical simulation of Antarctic weather system would be improved.

**Timeline**

2017-01-01 - 2019-12-31

**Regional emphasis**

Northern hemisphere: No

Southern hemisphere: Yes

**Further specification**

At King Sejong station, one radiosonde per day will be launched at 12 UTC during whole SOP of YOPP-SH. And prior to the SOP, one sounding per week is planned from mid-Feb to mid-Nov 2018. All these sounding data will be transmitted by GTS (WMO 89251) in real time with cooperation with KMA (Korea Meteorological Administration). The contact for King Sejong station is Sang-Jong Park sangjong@kopri.re.kr.

At Jang Bogo station, there will be a daily radiosonde at 18 UTC, in combination with three launches at the adjacent Italian Mario Zucchelli station at 00, 06, and 12 UTC. Thus, there will be four daily radiosonde launches in total from Terra Nova Bay. The sounding data at JBG has already been on GTS (WMO 89859). In addition, at Jang Bogo station, a ceilometer will measure cloud conditions. Contact for Jang Bogo station is Tae-Jin Choi ctjin@kopri.re.kr.
IBRV ARAON plans to have cruises mostly at Ross Sea sector during YOPP-SH SOP. During the cruises, surface meteorological data will be acquired and transferred to GTS (call sign: DSQL7) with three hours interval.

**Key project deliverables**

Radiosonde sounding data at King Sejong station and Jang Bogo station;
Surface meteorological data at King Sejong station and Jang Bogo station;
Cloud height and fraction at Jang Bogo station;
Surface meteorological data at IBRV ARAON at Ross sea.

**Data management**

Korea Polar Data Center (KPDC, http://kpdc.kopri.re.kr) and the YOPP online data archive center

Is data provided to WMO Global Telecommunication System

Yes

**Real-time provision**

radiosonde sounding data and surface meteorological data

**Timelines**

<table>
<thead>
<tr>
<th>Location</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Start date</th>
<th>End date</th>
<th>Activity</th>
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<td>King Sejong station</td>
<td>62.22S</td>
<td>58.78W</td>
<td>2018-11-16</td>
<td>2019-02-15</td>
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<td>164.23E</td>
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<td>2019-02-15</td>
<td>radiosonde sounding and surface meteorological observation</td>
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<td>75S-70S</td>
<td>W170-E170</td>
<td>2018-11-16</td>
<td>2018-02-15</td>
<td>marine surface meteorological observation</td>
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