China-Iceland Joint Aurora Observatory

14 June 2012, Shanghai
Introduction on Polar Atmospheric and Space Physics Division (PASP) in PRIC

Main research interests
• Aurora and magnetospheric dynamics
• Polar ionosphere
• Polar upper and middle atmosphere
• Plasma waves in polar regions
• Coupling between solar wind, magnetosphere, ionosphere, and upper/middle atmosphere
• Space weather and climate
Aurora Observatories in the Antarctic and Arctic

Yellow River Station: (78.9°N, 11.9°E), 76.24°MLAT, MLT≈UT+3h
Kjell Henriksen Observatory (KHO): (78.1°N, 16.0°E), 75°MLAT, MLT≈UT+3h
Zhongshan Station: (69.4°S, 76.4°E), -74.5°MLAT, MLT≈UT+1.75h
KunLun Station: (80.4°S, 77.4°E), -77.6°MLAT
• Zhongshan (Yellow River)
• Iceland
• Greatwall

Substorm onset region
Why to establish aurora Observatory in Iceland?
### Location of Aurora Observatory

- **Location**
  - Karholl
  - Svartarkot

<table>
<thead>
<tr>
<th>Location</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karholl</td>
<td>N 65° 42’ 21.78”</td>
<td>W 17° 21’ 47.4”</td>
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<tr>
<td>Svartarkot</td>
<td>N 65° 20’ 31.74”</td>
<td>W 17° 14’ 42.4”</td>
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</table>
Kárhóll

Transportation: HW 1, 61 km from Akureyri; 2 km from Laugur;

Electric Power: supply from power company

Communication: Access Internet by cable and wireless
What?

Campus: 158 ha; Width: 710 m; Length: 2225.35 m.
Main Campus for Scientific Research: 53.7 ha.
House: 158.9 m², 1 kitchen, 5 bedrooms, and 1 office
Storehouse and stable: 500 m²
Keep it unchanged.
Topographical map of Karholl
Main building of the Observatory
(A one-storey building)

The platform of roof

Optical platform: 144 m²
Electric platform: 48 m²
Reserved platform: 60 m²

Total: 252 m²

Unit: dm
Main building:

- Wall
- Half wall + glass
- Closet
- Cloakroom (distribution cabinet)
- Maintain & Store for Instruments
- Electronic Lab
- Optical Lab
- Meeting and rest room
- Garage
- Garage: 20 m²
- Cloakroom: 12.5 m²
- Meeting room: 56 m²
- Optical room: 40 m²
- Electric room: 32 m²
- Store: 32 m²
- Total: 252 m²
- Balcony: 32 m²

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<table>
<thead>
<tr>
<th>Class</th>
<th>Instruments</th>
<th>Number</th>
<th>Planning</th>
<th>Remark</th>
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<tr>
<td>Passive Optical Observations</td>
<td>All-sky CCD Imagers</td>
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<td>1 step</td>
<td>Aurora</td>
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<tr>
<td></td>
<td>Auroral Spectrograph</td>
<td>1</td>
<td>2 step</td>
<td>Aurora</td>
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<td></td>
<td>F-P Interferometer</td>
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<td>Future</td>
<td>Thermosphere</td>
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<tr>
<td>Active Optical detection</td>
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<td>2 step</td>
<td>Middle/upper Atmos.</td>
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<tr>
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<td>1 step</td>
<td>Magnetic field</td>
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<tr>
<td></td>
<td>Induction magnetometer</td>
<td>1</td>
<td>2 step</td>
<td>Magnetic field</td>
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<tr>
<td></td>
<td>Wide band Riometer</td>
<td>1</td>
<td>1 step</td>
<td>Ionosphere</td>
</tr>
<tr>
<td></td>
<td>Imaging Riometer</td>
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<td>Future</td>
<td>Ionosphere</td>
</tr>
<tr>
<td></td>
<td>GPS Receivers</td>
<td>3</td>
<td>2 step</td>
<td>Ionosphere</td>
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<tr>
<td></td>
<td>Meteorological Station</td>
<td>1</td>
<td>1 step</td>
<td>Meteor</td>
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<tr>
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<td>VLF Receiver</td>
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<td>Future</td>
<td>Wave</td>
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<tr>
<td>Active Radio Detections</td>
<td>Ionosphere Digisonde</td>
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<td>2 step</td>
<td>Ionosphere</td>
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<tr>
<td></td>
<td>Meteor Radar</td>
<td>1</td>
<td>Future</td>
<td>Middle/Upper Atmos</td>
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<td></td>
<td>MF Radar</td>
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<td>Future</td>
<td>Middle/Upper Atmos</td>
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<td></td>
<td>Incoherent Scatter Radar</td>
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<td>Future</td>
<td>Ionosphere</td>
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<tr>
<td>Active Atmospheric Investigations</td>
<td>Sounding balloons</td>
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<td>Future</td>
<td>Atmosphere</td>
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<td></td>
<td>Air Samplers</td>
<td></td>
<td>Future</td>
<td>Atmosphere</td>
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Multiple-wavelength all-sky imagers
(427.8/557.7/630.0nm, Panchromatic)
Auroral spectrograph
(420-730nm)
Active optical detection instruments:
Lidar
Imaging Riometer

Radio Observation in Yellow River Station

Passive radio detection
Fluxgate Magnetometer

Induction magnetometer
Ionospheric TEC & Scintillation

GPS receivers
Ionospheric Digisonde

Active radio detection
How to realize it cooperatively?

• In order to build a long term observatory, we have to answer:
  – How to purchase the place at Karholl?
  – How to construct the observatory?
  – How to operate the observatory?
  – How to......

&When......?

Thanks for you attention!