North Pacific Oceanography: Past, Present and the FUTURE

A Half-Century Bibliometric Survey

http://www.pices.int

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Pacific Oceanological Institute FEB RAS
Vladivostok, Russia
How to measure the science?

We may count inputs in the science:

- People involved
- Institutions involved
- University funds
- Grants supported
- etc.

We may count the scientific outputs:

- Papers published
- Journals issued
- Books published
- Conferences held
- Patents, reports, etc.

"Black Box" of Science
We used:

1) Databases of Institute for Scientific Information (ISI, now is Thomson Reuters, Philadelphia, USA)

   http://www.isiknowledge.com

   ■ Science Citation Index Expanded (SCI-Expanded)
     1945-present (more then 6500 journals);
   ■ Social Sciences Citation Index (SSCI)
     1956-present (more then 2000 journals);
   ■ Arts & Humanities Citation Index (A&HCI)
     1975-present (less then 1500 journals)

2) Ulrich’s Periodicals Directory (Bowker, USA)

   ■ More then 300,000 scientific journals and other serials

   http://www.ulrichsweb.com
Growth of Earth Science Journals

1 - Earth Sciences 4.6
2 - Geology 3.9
3 - Oceanography 5.6
4 - Remote Sensing 8.0

Data from Nabiullin (2007)
Growth of East Asia Science

Data from Nabiullin (2007)
## Growth Dynamics of East Asia Science

<table>
<thead>
<tr>
<th>Country</th>
<th>Growth Rate (%) per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea</td>
<td>30.4</td>
</tr>
<tr>
<td>China</td>
<td>22.0</td>
</tr>
<tr>
<td>Singapore</td>
<td>20.9</td>
</tr>
<tr>
<td>Taiwan</td>
<td>16.8</td>
</tr>
<tr>
<td>Vietnam</td>
<td>16.3</td>
</tr>
<tr>
<td>Indonesia</td>
<td>14.1</td>
</tr>
<tr>
<td>Thailand</td>
<td>13.3</td>
</tr>
<tr>
<td>Malaysia</td>
<td>12.9</td>
</tr>
<tr>
<td>Japan</td>
<td>10.8</td>
</tr>
<tr>
<td>Philippines</td>
<td>9.8</td>
</tr>
</tbody>
</table>

1992-2007 years only

- **Very fast**: Korea, China, Singapore, Taiwan, Vietnam
- **Fast**: Indonesia, Thailand, Malaysia
- **Relatively Slow**: Japan, Philippines

Arctic Ocean v. Pacific Ocean Studies: A Comparison

Cumulated Items

- North Pacific Papers in GeoRef, 1900-2007
  - Doubling Period \( D = 8.0 \) years

- D.Machoczek (1990)
  - Bibliography on Polar Seas, 1723-1990
  - Doubling Period \( D = 18.5 \) years

Time interval of the study
Search in the ISI Databases

Results: 8870
Topic = North Pacific OR Northern Pacific

• 8,597 records in Natural Sciences
• 201 records in Social Sciences
• 154 records in Arts & Humanities

Search Date: 17 September, 2008
Growth of the North Pacific Publications

<table>
<thead>
<tr>
<th>Year of publication</th>
<th>Papers per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>1</td>
</tr>
<tr>
<td>1950</td>
<td>10</td>
</tr>
<tr>
<td>1960</td>
<td>100</td>
</tr>
<tr>
<td>1970</td>
<td>1000</td>
</tr>
<tr>
<td>1980</td>
<td>10000</td>
</tr>
<tr>
<td>1990</td>
<td>100000</td>
</tr>
<tr>
<td>2000</td>
<td>1000000</td>
</tr>
<tr>
<td>2010</td>
<td></td>
</tr>
</tbody>
</table>

Subjects of the North Pacific Publications

Oceanography 25.3%
Meteorology 20.0%
Ecology & Environment 9.9%
Geosciences Multidisciplinary 9.9%
Marine Biology 9.4%
Geochem & Geophys 5.7%
Fisheries 4.7%
Other 15.1%
The growth of North Pacific Research in Some Disciplines

Search results: 8659
Topic="North Pacific"
ISI databases, 1945-2007

Meteorology & Atmospheric Sciences
Geochemistry & Geophysics
Fisheries

17-19 September, 2008
A Bibliometric Study of Co-operation in East Asia
Table 1. Growth rates of some disciplines in North Pacific Research

<table>
<thead>
<tr>
<th>Discipline</th>
<th>D (Years)</th>
<th>S (% per Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Sciences &amp; Ecology</td>
<td>4.15</td>
<td>24.1</td>
</tr>
<tr>
<td>Meteorology &amp; Atmospheric Sciences</td>
<td>4.89</td>
<td>20.5</td>
</tr>
<tr>
<td>Marine Biology</td>
<td>5.03</td>
<td>19.9</td>
</tr>
<tr>
<td>Oceanography</td>
<td>5.21</td>
<td>19.2</td>
</tr>
<tr>
<td>Fisheries</td>
<td>7.05</td>
<td>14.2</td>
</tr>
<tr>
<td>Multidisciplinary Geosciences</td>
<td>7.47</td>
<td>13.4</td>
</tr>
<tr>
<td>Geochemistry &amp; Geophysics</td>
<td>10.38</td>
<td>9.6</td>
</tr>
<tr>
<td>Total Papers</td>
<td>5.52</td>
<td>18.1</td>
</tr>
</tbody>
</table>
Countries of the North Pacific Research

- USA: 45%
- Japan: 18%
- Canada: 7%
- China: 5%
- UK: 4%
- Germany: 3%
- France: 3%
- Russia (USSR): 3%
- Australia: 3%
- South Korea: 3%
- Taiwan: 2%
- Other: 1%

- USA
- Japan
- Canada
- China
- UK
- Germany
- France
- Russia (USSR)
- Australia
- South Korea
- Taiwan
- Other
The growth of research on North Pacific in different countries

17-19 September, 2008
A Bibliometric Study of Co-operation in East Asia
<table>
<thead>
<tr>
<th>Country</th>
<th>D (Years)</th>
<th>S (% per Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taiwan</td>
<td>2.37</td>
<td>42.2</td>
</tr>
<tr>
<td>China</td>
<td>2.78</td>
<td>35.9</td>
</tr>
<tr>
<td>South Korea</td>
<td>3.07</td>
<td>32.6</td>
</tr>
<tr>
<td>Japan</td>
<td>4.18</td>
<td>24.0</td>
</tr>
<tr>
<td>Russia/USSR</td>
<td>4.60</td>
<td>21.8</td>
</tr>
<tr>
<td>Canada</td>
<td>4.73</td>
<td>21.1</td>
</tr>
<tr>
<td>USA</td>
<td>6.23</td>
<td>16.0</td>
</tr>
</tbody>
</table>
Main Subjects of the Publications

- Four main interrelated subjects account for 63% of the total publications.

A. Oceanography (2593)
B. Meteorology (2049)
C. Ecology (1015)
D. Marine Biology (967)
Scientific Co-operation in the North Pacific Science
(four main subjects only)
Citations of the North Pacific Publications

Total 8870 publications

Scientific Co-operation in the North Pacific Countries in Scientometric Research
Have you any questions?

Thank You!

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