

**Workshop on the Causes and Consequences of Climate-
Induced Changes in Pelagic Fish Productivity in East Asia
(APN 2001-07)**

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China, Japan, Malaysia, Republic of Korea, Russia, USA

Introduction/Background

Small pelagic fish (sardines and anchovies, etc.) constitute a great portion of the fisheries catch in Japan, Korea, the East Coast of China and the Pacific coast of Russia. Young fish recruit in the coastal areas of the Yellow Sea, the Sea of Japan (Korean East Sea) and the Pacific coast of Japan, and the adults expand to occupy the region from Sakhalin (Russia) to the south coast of China. Dramatic and synchronic fluctuations in their catches have occurred in the above four countries in the last few decades. Research to date suggests that these stock fluctuations are caused by changes in ocean climate. Understanding how the productivity of small pelagic fish stocks is linked to ocean climate and predicting the productivity cycles of the ocean is essential to avoid overexploitation when the ocean shifts to a period of low productivity. As the populations move freely across national boundaries under the influence of a common ocean climate, it is essential to conduct joint research and develop a concerted synthesis of the factors controlling the productivity of small pelagic fish stocks in the region. To initiate this synthesis, it is considered timely to hold the first regional workshop to overview the status in each country, and to seek the possibility of mutual cooperation in East Asia.

In such a context, the Workshop on the causes and consequences of climate-induced changes in pelagic fish productivity in East Asia took place in Kobe, Japan, August 25-27, 2001, as a part of the Small Pelagic Fish and Climate Change (SPACC) program of IGBP-GLOBEC (Global Ocean Ecosystem Dynamics). It involved 30 participants from China, Japan, Korea, Malaysia, Russia and USA. The objectives of the meeting were: (1) to review our knowledge of decadal fluctuations of small pelagic fish populations in East Asia, and determine the existence of regional synchronies in these fluctuations, (2) to initiate regional synthesis on the factors controlling the productivity of small pelagic fish in East Asia, and (3) to develop a strategic plan for SPACC in East Asia identifying ongoing activities and critical gaps in our knowledge.

Outline of activities conducted

The workshop lasted for three days, with a day and a half of presentations, and a day and a half of working group discussions and a final plenary session. The presentation sessions provided a forum for presentation of research activities in East Asia primarily on climate-induced changes in pelagic fish productivity. At the latter part of the workshop, two working groups were assigned depending on the area of study: Tsushima Warm Current regions (East China Sea, Yellow Sea, Japan Sea/Korean East Sea) and

Kuroshio regions (North-western Pacific). Lastly, identifying common goals, the possibility of mutual cooperation in East Asia was discussed in more detail, and the future direction toward developing a regional science plan to be implemented throughout East Asia was proposed.

Outcomes/Products

The present status of GLOBEC-SPACC projects of each country has been well documented. In the 1990s, there have been several ongoing research projects on the productivity of small pelagic fish in relation to decadal/multi-decadal changes in climate and ocean environment. It was confirmed that there existed apparent regional synchronies in the time-series of productivity, implying that it will be of great value to promote the cooperative work and make a regional synthesis of the time-series data. Through working group discussions, major target species and their stock compositions were identified, and research subjects to be investigated in the near future were identified for each of the two aforementioned regions.

Future directions/Follow-up work

As a follow-up activity, coordinated research cruises and future workshops aiming to produce comparable data sets in a common format, and to initiate the analysis of those data are proposed. Focus would be on small pelagic fish productivity in three major ecosystems of East Asia: East China Sea, Sea of Japan (Korean East Sea), and Kuroshio-Oyashio regions. Several venues are also suggested for the next workshop, including (a) GLOBEC/PICES meeting in Qingdao, China, in October 2002, and (b) the 40th Anniversary of the Japanese Society of Fisheries Oceanography, Tokyo, Japan, in December 2002.

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