International approaches to sediment disaster sciences

○ Tomomi MARUTANI, Lab. Earth Surface Processes and Land Management, Graduate School of Hokkaido University, Sapporo

Introduction

Since 2001 Japanese Society of Erosion Control Engineering (JSECE) has launched the internationalization of education, research and skill training. The international symposium, which was composed by invited speakers from Asian countries, was held biennially at the local town in Japan. However the speakers invited for the symposium were mostly educated by Japanese-based knowledge on erosion control engineering. In the autumn 2009, we have started the rim Pacific international symposium on sediment disasters in Tokyo, and it was taking over in Sapporo 2011. These symposiums have invited the delegates not only from Asian countries but also from USA, Australia, New Zealand, Singapore and Germany. Since then international approaches to sediment disaster sciences were introduced for young scientists and technicians.

Antecedent to the rim Pacific international symposium, the JSECE have been publishing the international journal at twice every year. We have combined the submission of presented paper in the symposiums and the publication as the special issues of the international journal. This year the international session of the conference of JSECE for Japanese and foreign students is reconstructed. The triangle structure between the international journal, the international symposium and the international session can well perform the internationalization of JSECE (Fig.1). Furthermore high-quality submission to the international journal by the world-class scientists can be desired like a blue circle in the figure.

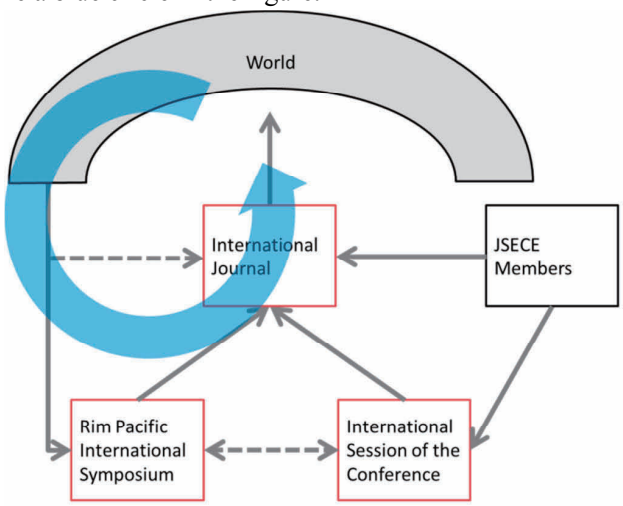

Figure 1. Triangle structure of the international journal, the international symposium and the international session of JSECE.

International journal supported by the contributions from the international symposium, the international session and the JSECE members will transmit the information of sediment disasters in Japan. The world scientists will have interests to submit their papers to th international journal too.

Scientific Background of Sediment Disaster Sciences

Erosion control engineering, which has been attached as the extension of forest science, is primitively not science but “engineering”. Many scientists and engineers originated from hydraulics, dam engineering, geomorphology and ecology have supported the society of erosion control engineering with their experiences. They also have different backgrounds such as structural mechanism, fluid dynamics, earth science and biology. However there is unfortunately no background in sediment disaster science. If we would desire the interests of the world-class scientists to the international journal, the scientific background of sediment disaster science is required.

Up to current times, Japanese research style in sediment disasters was subject to interest in the specific disaster experiences or the hydraulic simulation for specific behavior of sediment transport. These are useful as the episodic countermeasure, and supplying the empirical guideline. Meanwhile the sediment disaster science has been not authorized as a branch of natural sciences. However the catchment study, which is based on system science, may yield a conceptual basis for sediment disaster science. The sedimentary system in catchment scale is characterized by several key concepts, such as coupling-decoupling (Brierley et al., 2000), relaxation path(Kasai et al., 2004), sediment delivery(Marutani et al., 1999) and significant tributary(Rice et al., 1998).

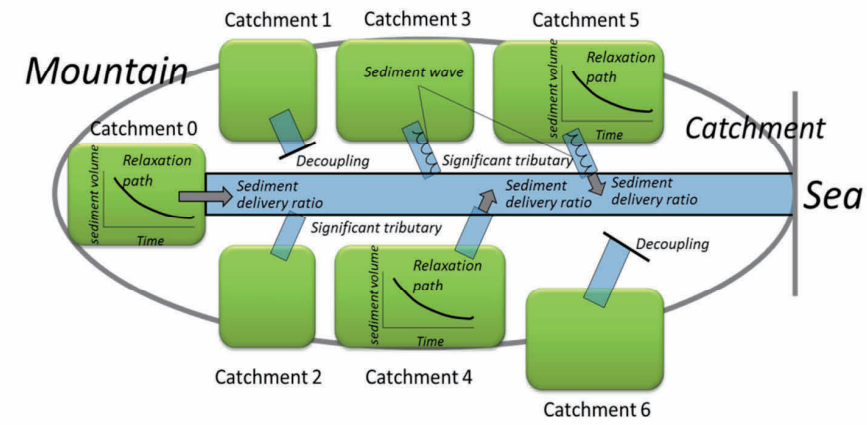

Figure 3. Idealized catchment composed by some small branches, illustrating the several indices, such as sediment delivery ratio, sediment wave, relaxation path, significant tributary and coupling-decoupling, for catchment characteristics of sediment transport.

We can combine those concepts each other as follows. *Sediment delivery* from tributary catchment to mainstream is dominated by *relaxation process* of tributary channel. In the case sediment was intervened by geomorphological components such as terrace, tributary channel and main stream may be *decoupled* in sediment transport process. Sediment attained from tributary to main stream is subject to form the *sediment wave* along channel course. Tributaries keep delivering sediment to main stream can be identified as the *significant tributaries* as a sediment sources. The above is an example for understanding the catchment system, and implies that systematically understanding catchment may supply a strong background to sediment disaster science.

To aim the substantial internationalization with high-quality scientific publications, we have not only to employ empirical knowledge and simulation, but also to systematically reconstruct the disciplinary identities based on scientific approach to sediment disaster science.

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