

The Process of Raised-Bed River Formation & Factors that Affect It

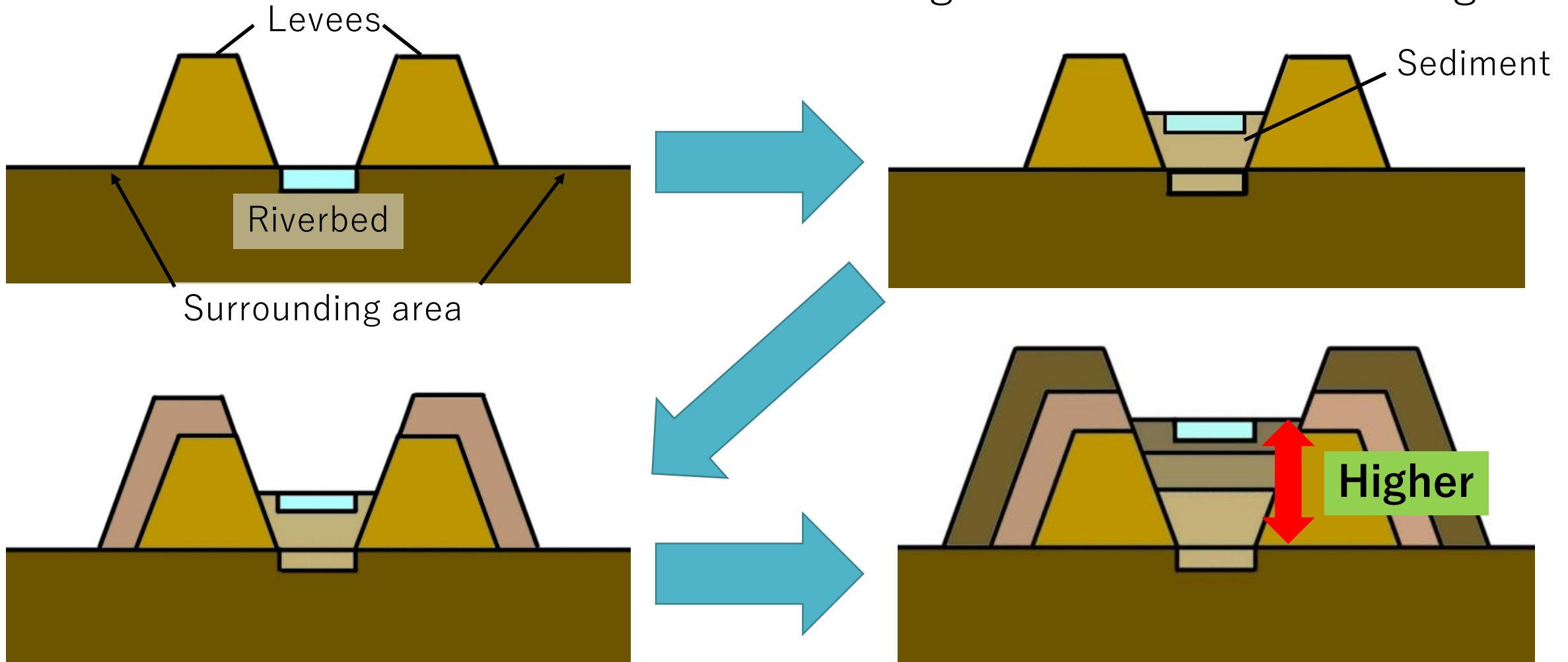
The background image shows a wide, concrete-lined river channel with a raised bed. The water flows over several low, stepped concrete structures. On the left, there is a paved walkway with a metal railing. In the background, there are several multi-story buildings, some with green roofs, and a range of green mountains under a blue sky with light clouds. A person is walking on the path in the foreground.

Gr.8, Science Research, Science & Math Course,
Hyogo Prefectural Kakogawa Higashi High School

Purpose

2

Raised-bed river: a type of a river whose bed is higher than the surrounding area



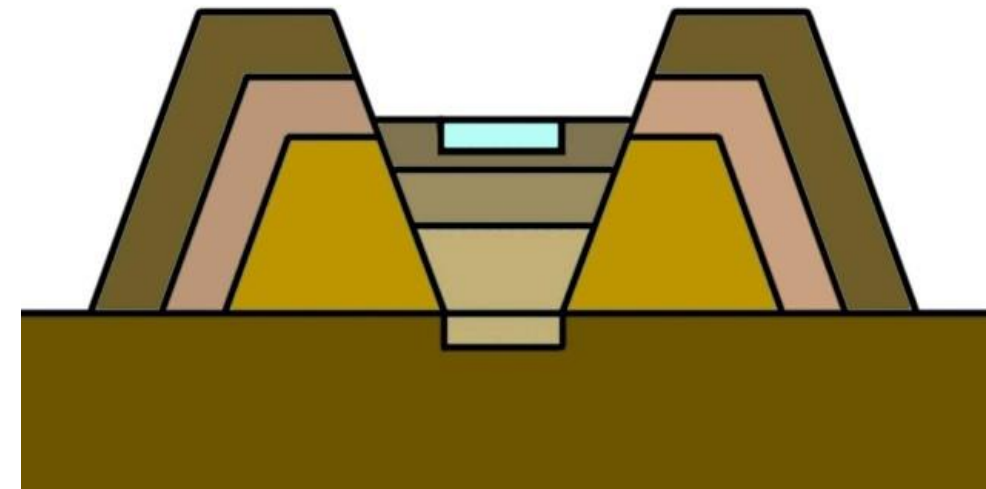
General explanation

- a large amount of sediment
- building artificial levees



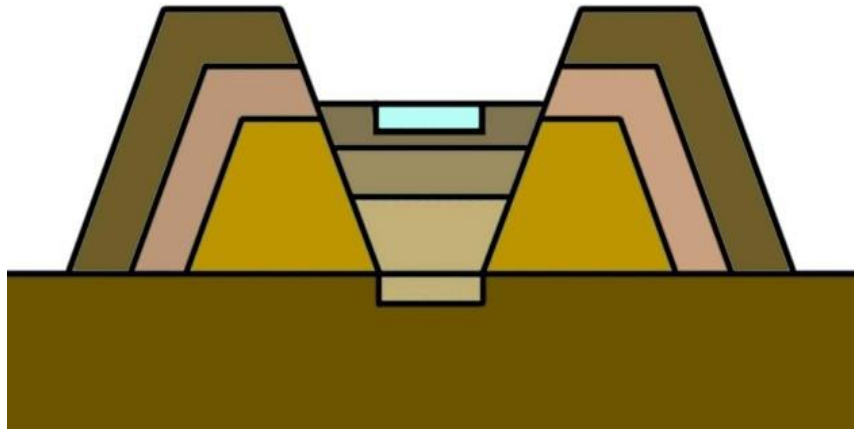
A question still remains.

**In what areas and how
are raised-bed rivers
formed?**



Cross-sectional view

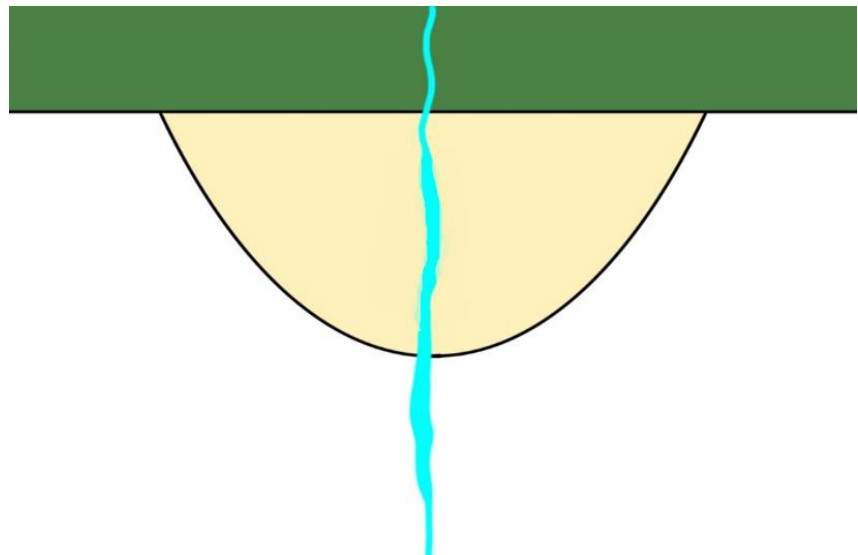
Purpose



Cross-sectional view



Longitudinal view



Overhead view

The list of rivers subjected to research

River	Location	
	Pref.	City
Makitagawa	Gifu	Yourou
Hiragawa	Shiga	Otsu
Momosegawa	Shiga	Takashima
Ashiyagawa	Hyogo	Ashiya
Sumiyoshigawa	Hyogo	Kobe
Ishiyagawa	Hyogo	Kobe
Narukogawa	Kyoto	Kizu
Koromozagawa	Gifu	Takasaki
Kusatsugawa	Shiga	Kusatsu
Syukugawa	Hyogo	Nishinomiya
Inzawagawa	Yamanashi	Nishiyatushiro



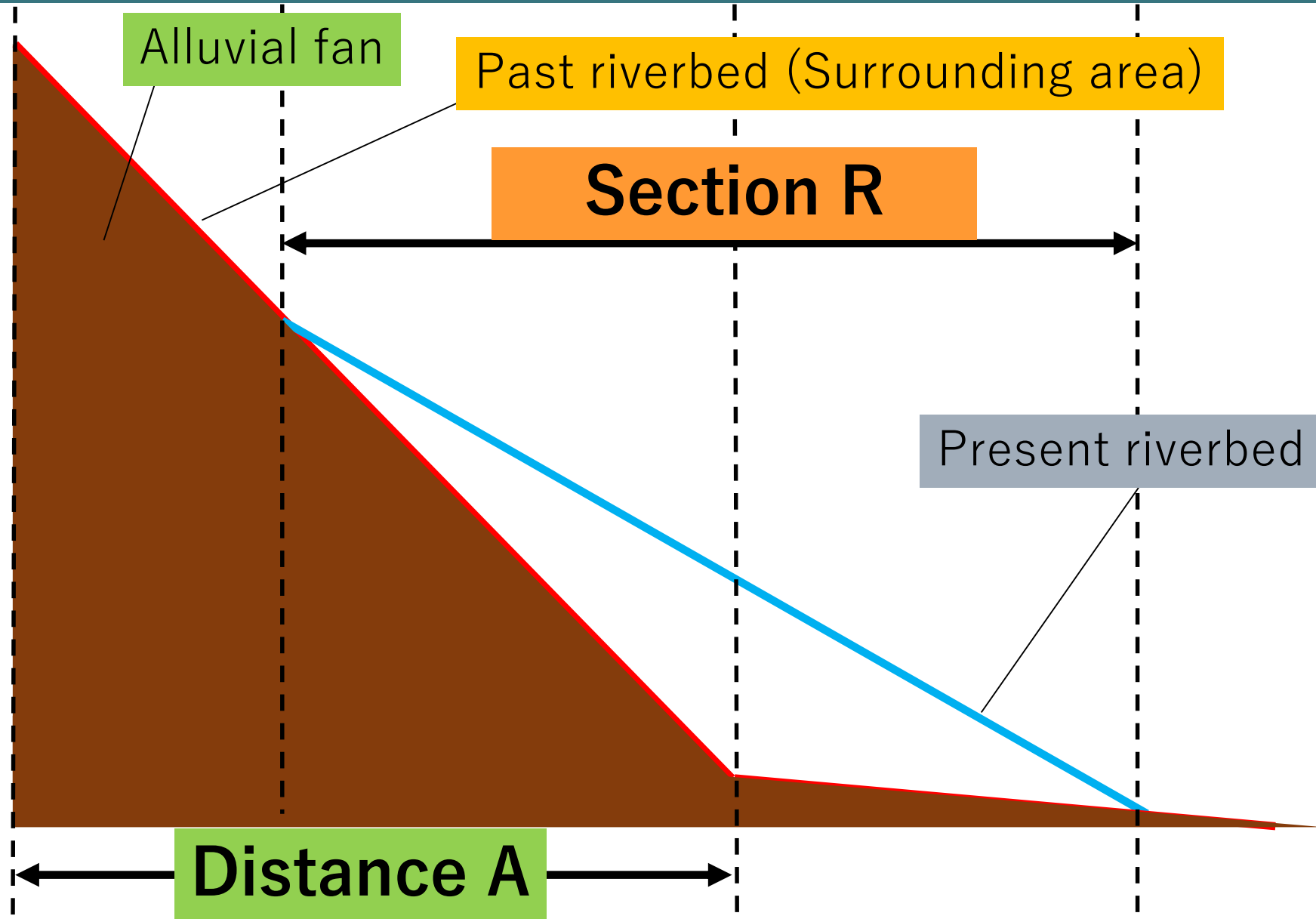
Source : Geospatial Information Authority of Japan Maps

Alluvial fan

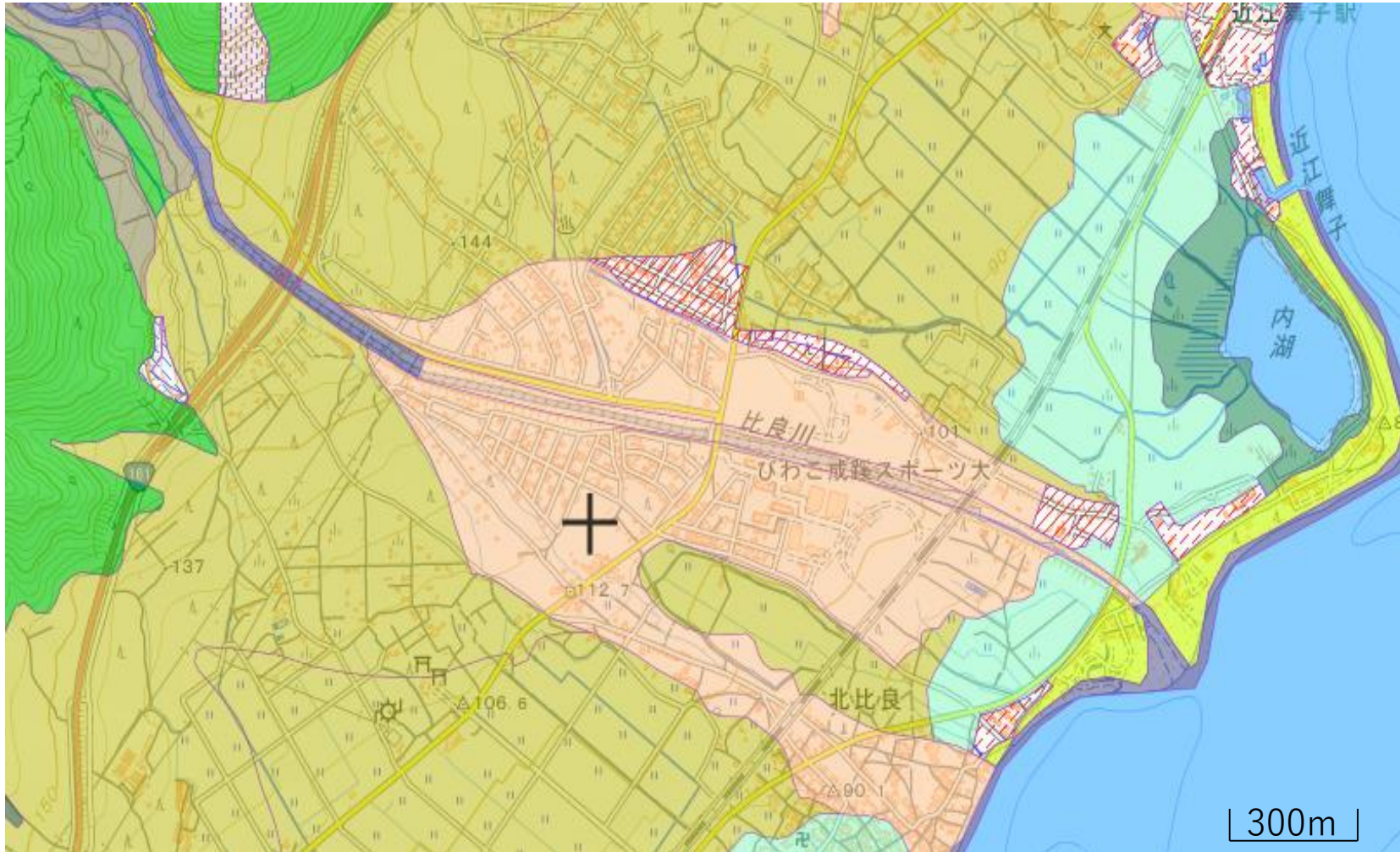
a triangle-shaped deposit of gravel, sand, and even smaller pieces of sediment, such as silt



Alluvial fan in Kofu bonchi (from Google earth)

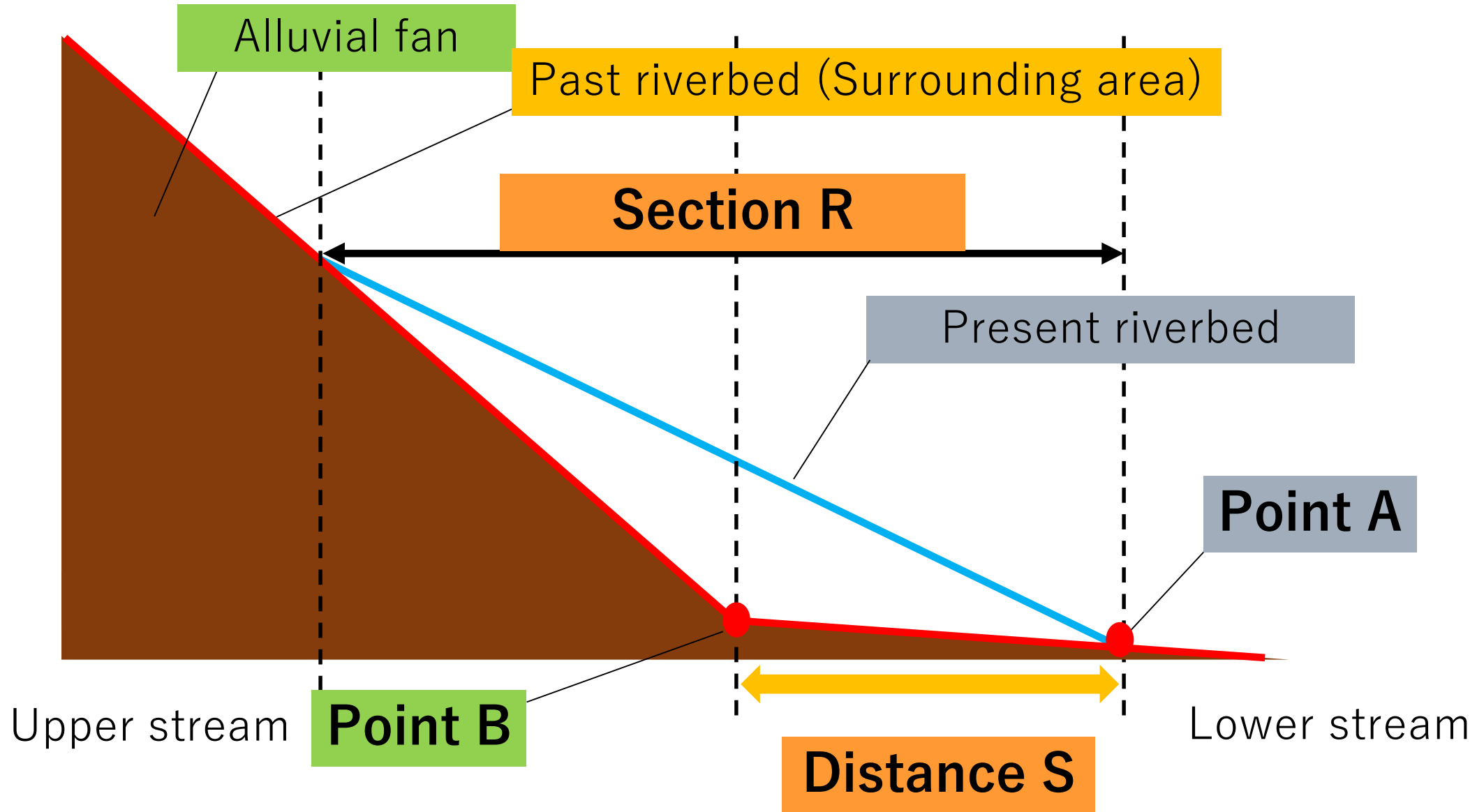


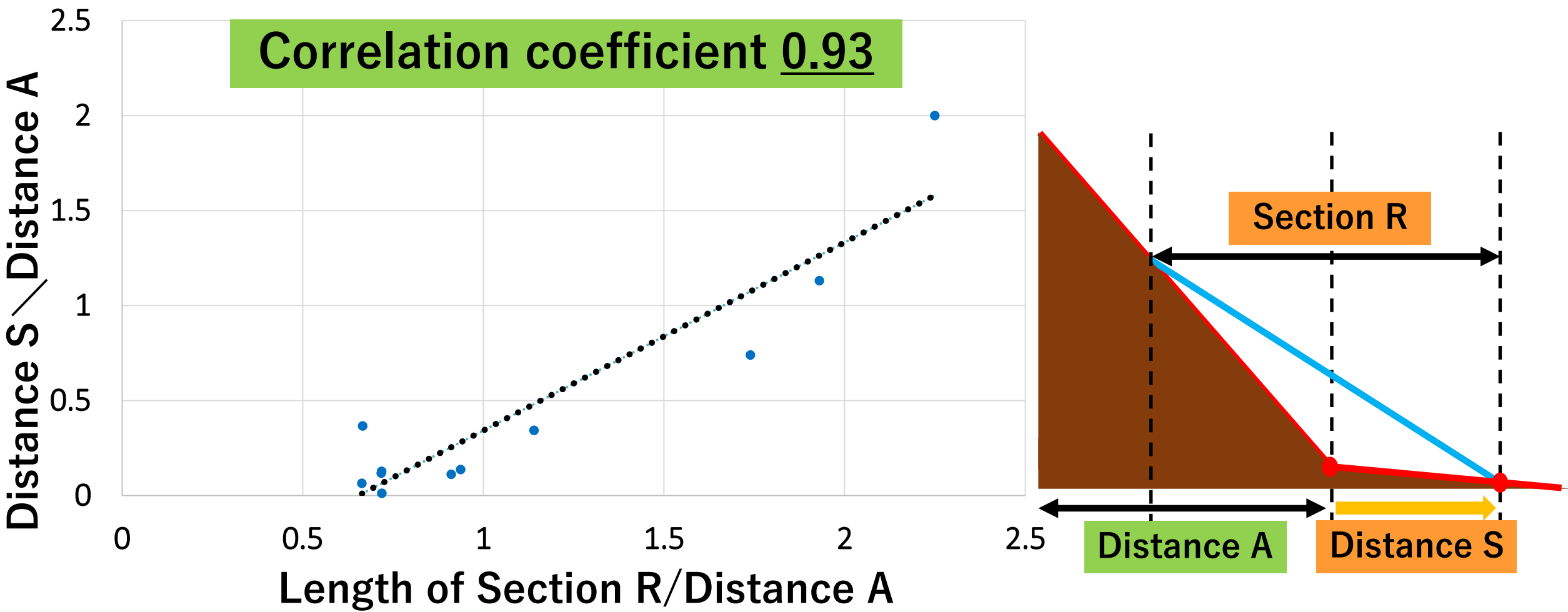
Geospatial Information Authority of Japan Map



- width of levees
- altitude of riverbed
- slope of riverbed, etc.

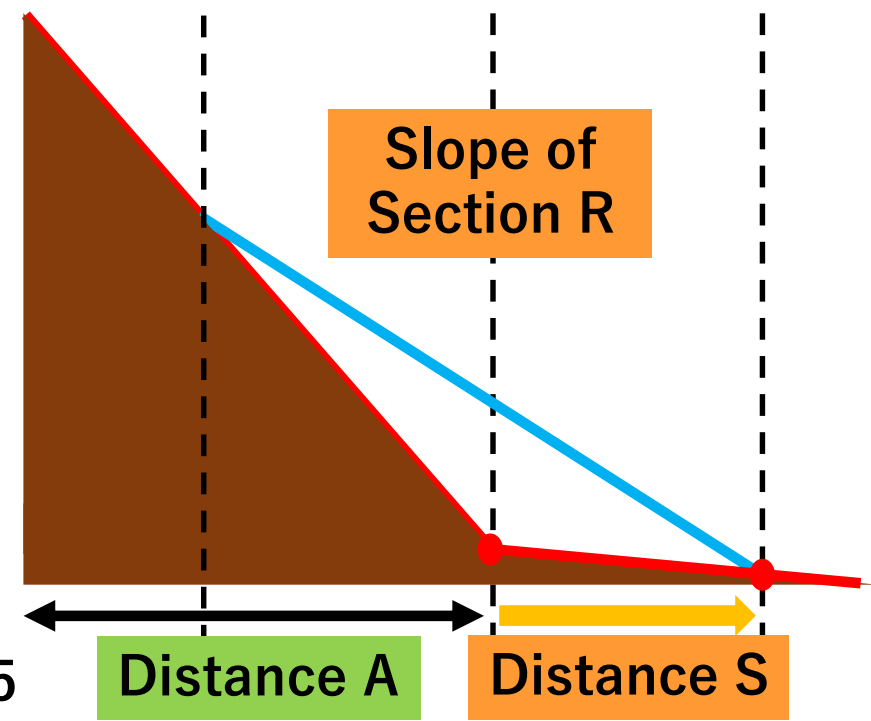
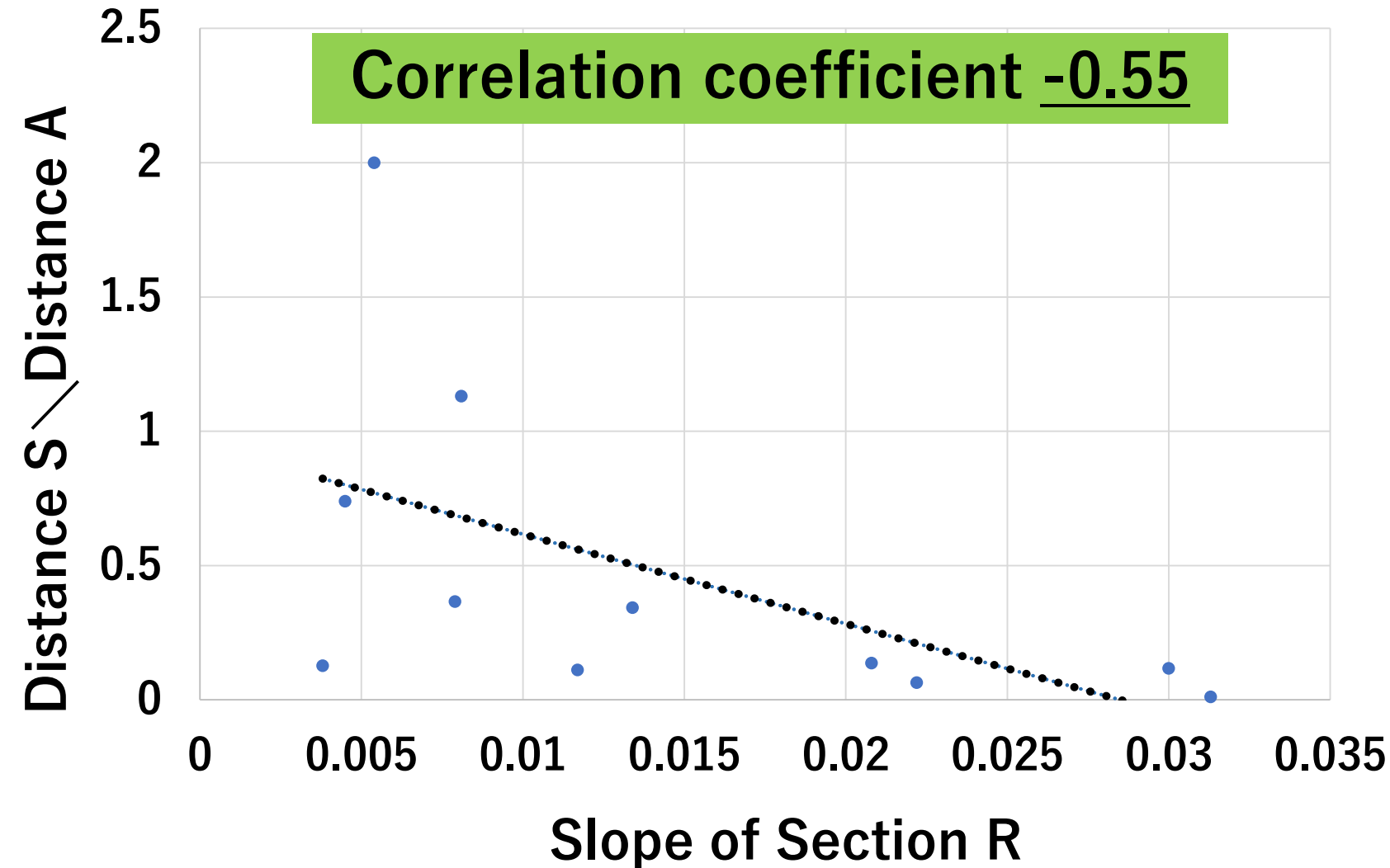
Results & Analysis (1) Longitudinal View



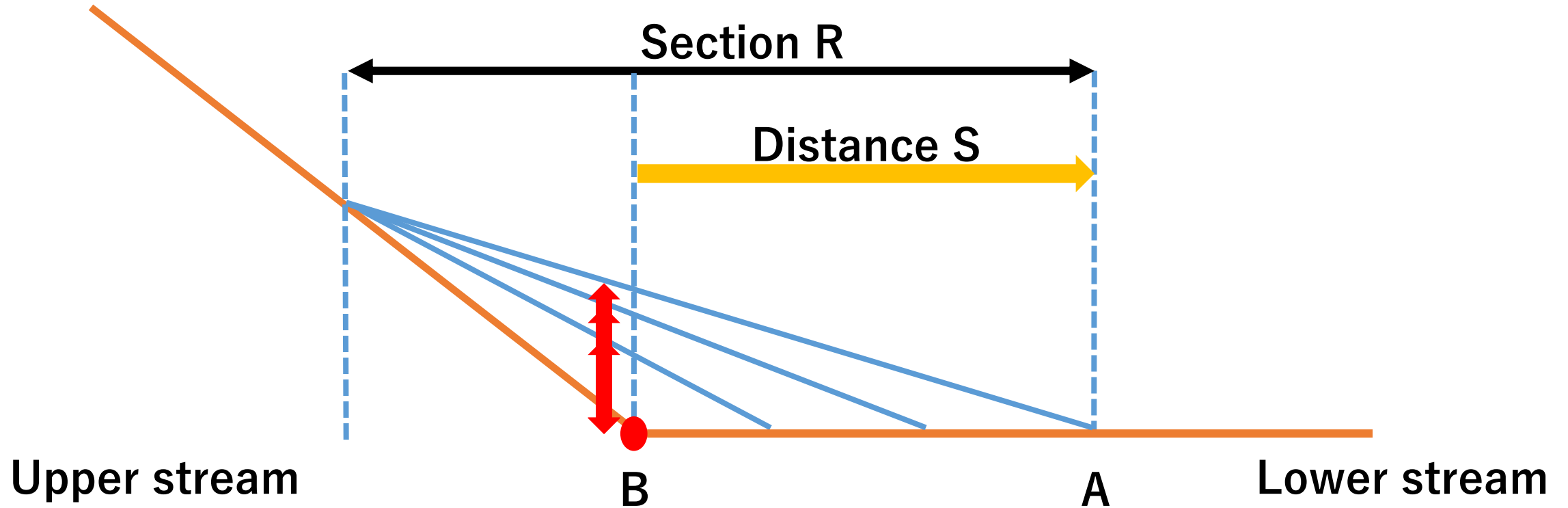


Relationship between Distance S and length of Section R

Correlation coefficient -0.55

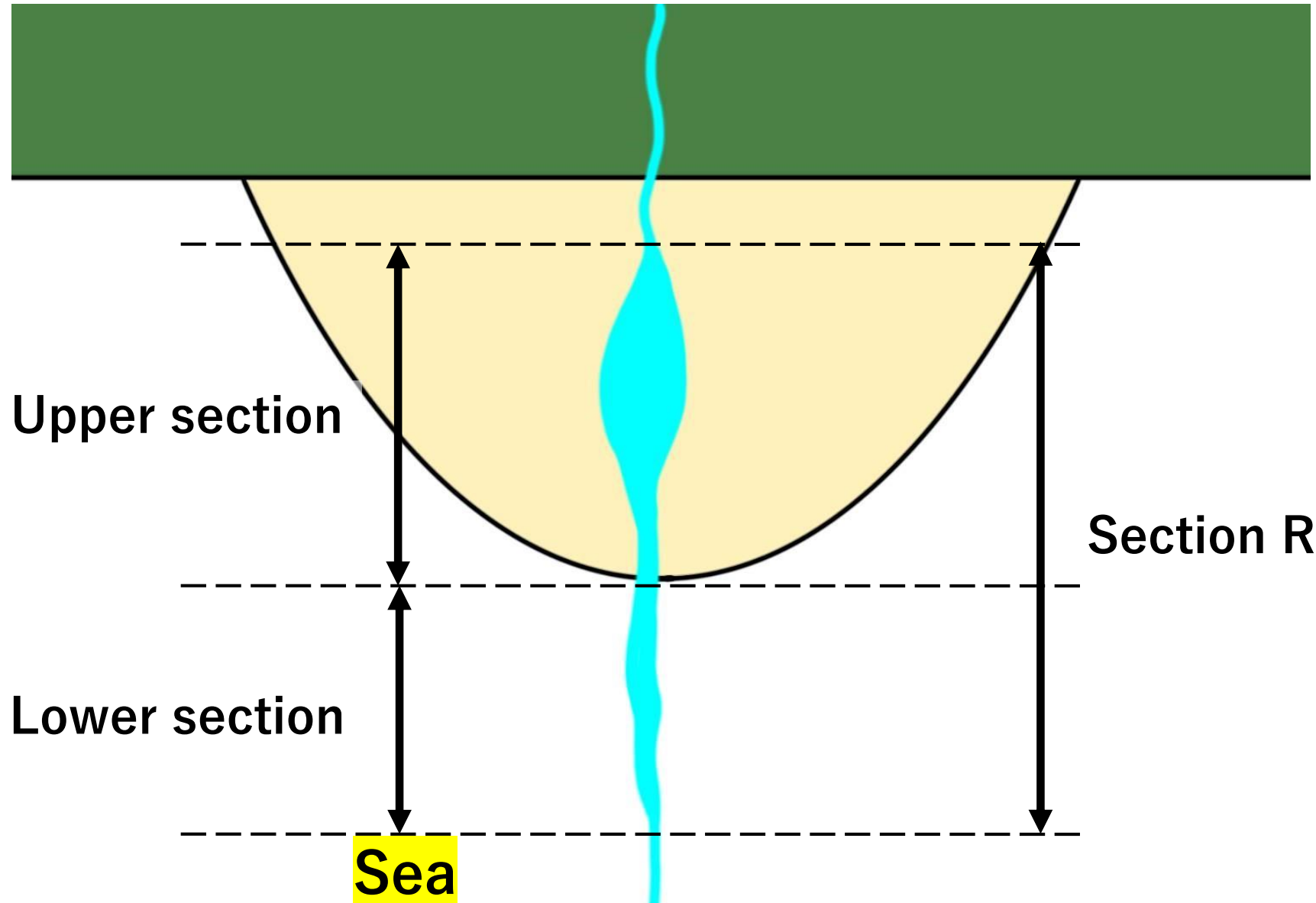


Relationship between Distance S and slope of Section R



A : Bottom of Section R
B : Base of an alluvial fan

Results & Analysis (2) Overhead View



Results & Analysis (2) Overhead View

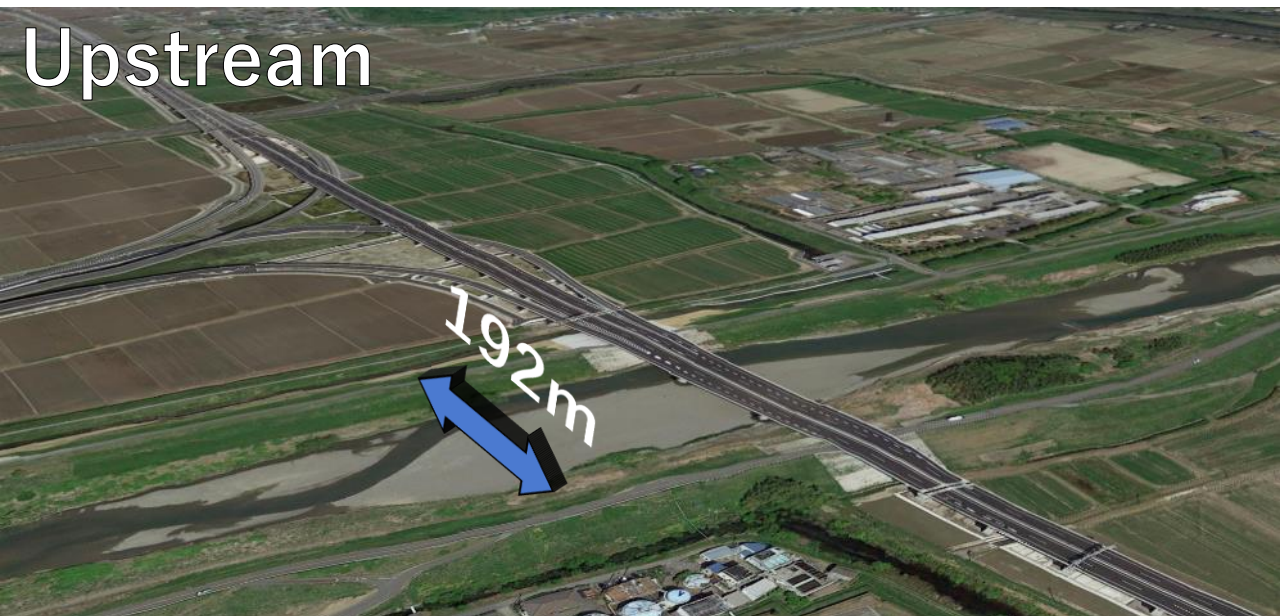
River Name	Prefecture	Average Width (m)		Upper Section /Lower Section
		Upper Section	Lower Section	
Makitagawa	Gifu	241	152	1.59
Hiragawa	Shiga	44	26	1.73
Momosegawa	Shiga	62	15	4.04
Ashiyagawa	Hyogo	79	79	0.993
Sumiyoshigawa	Hyogo	46	41	1.13
Ishiyagawa	Hyogo	46	34	1.35
Narukogawa	Kyoto	30	27	1.11
Inzawagawa	Gunma	11	12	0.946
Kusatsugawa	Shiga	46	56	0.818
Syukugawa	Hyogo	40	43	0.942
Shirushizawagawa	Yamanashi	16	11	1.42

**Wider
(7 out of 11)**

Average widths of Upper section and Lower section of raised-bed rivers

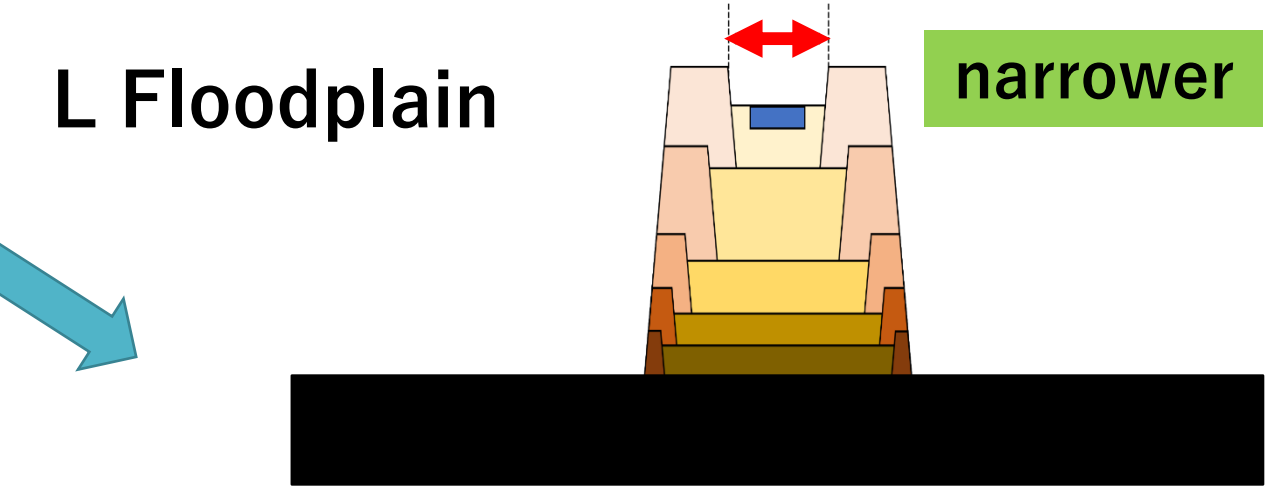
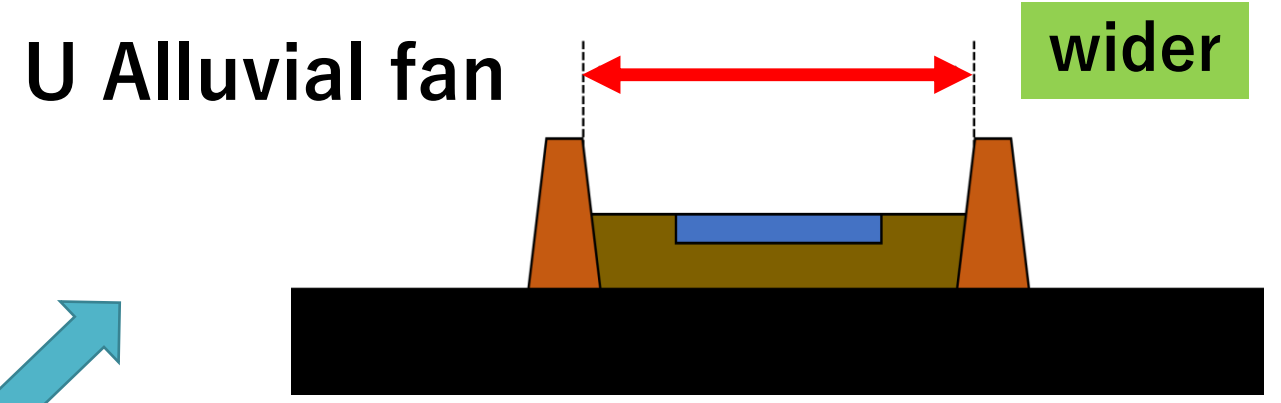
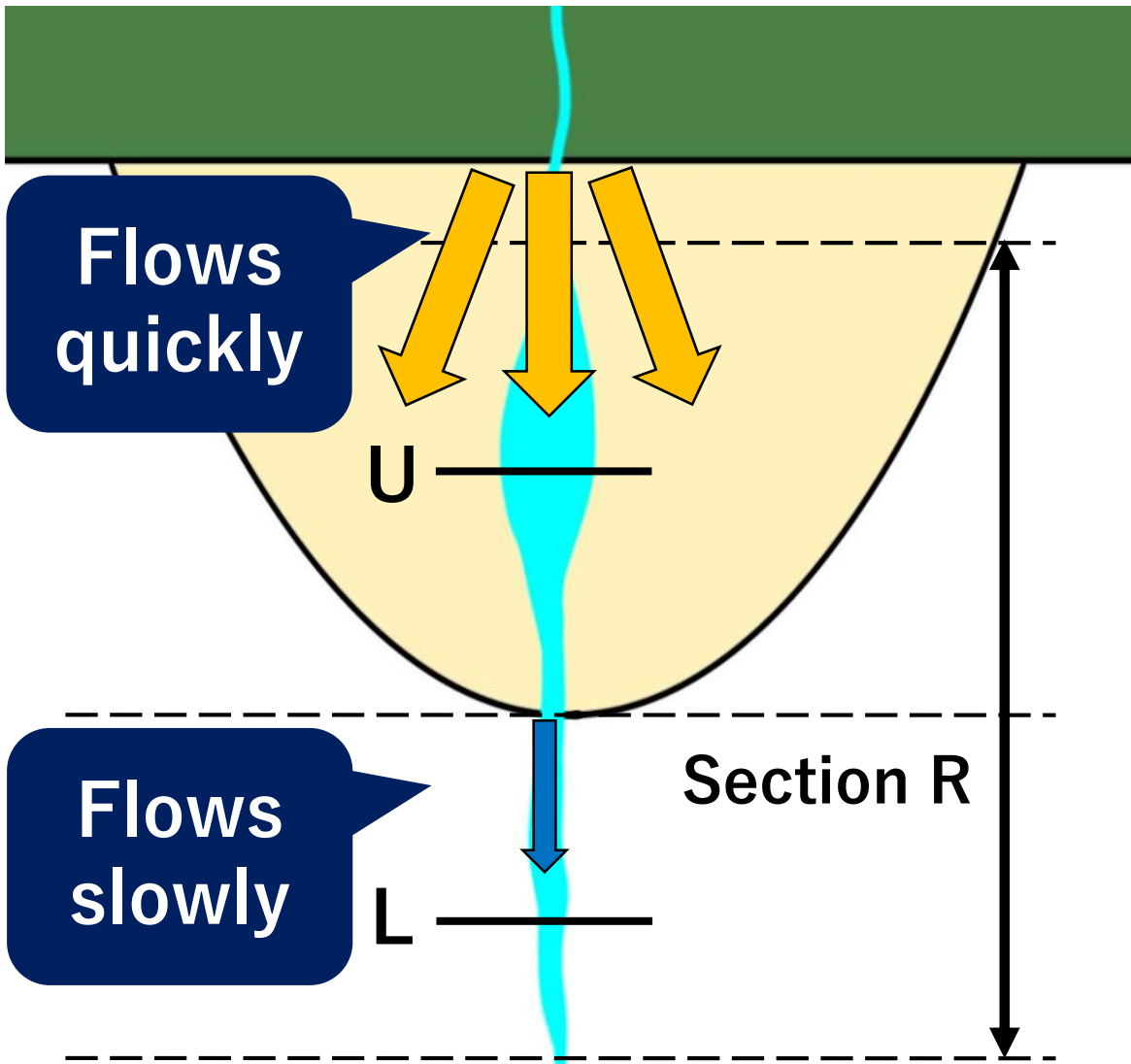


Normal River Kinokawa River (Wakayama Pref.)

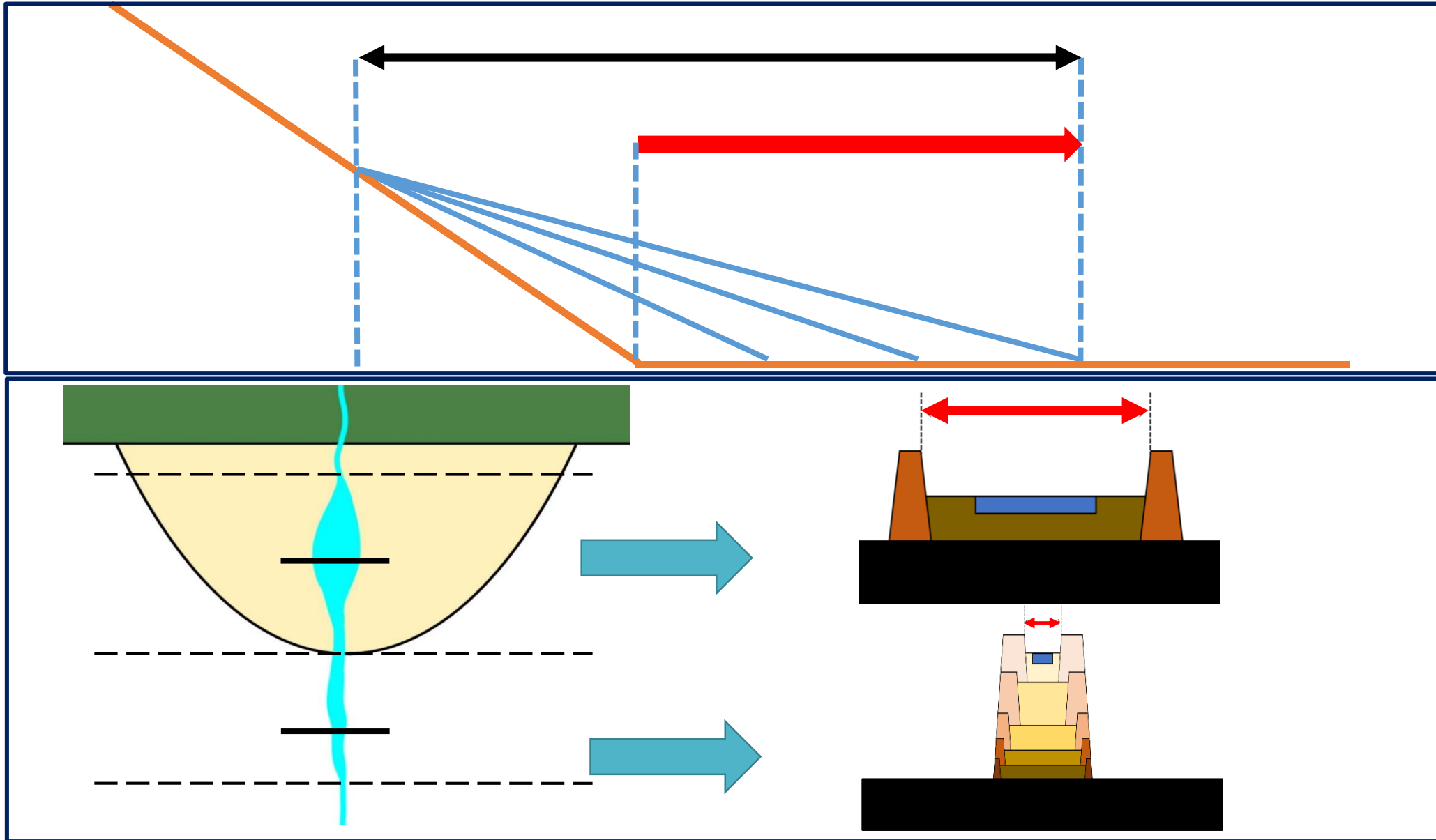


Raised Bed River Makita River

Results & Analysis (2) Overhead View



Conclusion



- Investigator Ryo Nakatsuka from Muko City Center For Archaeological Operations.
- Yamauchi Hidemine from Kobe Engineering Office , Hyogo Prefecture.

- Takuya Ikeda, Yuichi IKEDA : Basic research on riverbed fluctuations near the change point of gradient and river width , Civil Engineering Society Kanto Branch Technical Research Presentation , Vol.32-2, 111-112, 2005
- Hisashi ISOZAKI : Tractive Force of the Bed-risen River(I), Journal of the Agricultural Engineering Society, Vol.21-5, pp.311-316, 1954
- Yoshiaki KAGOSE : Natural Levee, Kokon Shoin, pp.196-217, 1975
- Kyoto Pref., The 1st Technical Review Committee on the raised-bed river , About the raised-bed river in the prefecture (Document No.2) , Kyoto Pref., pp1-4, 2020, 9, 9
- Geospatial Information Authority of Japan, Typical Topographies of Japan, Topography due to the action of rivers , 4-24 Raised Bed River, Geospatial Information Authority of Japan :GSI HOME PAGE, 2020, 10, 7
- Kenichi SAITO, Hiroshi IKEDA : On The Formative Processes of Raised-Bed Rivers in Kofu Basin Yamanashi Prefecture, Report from University of Tsukuba Hydraulic Experiment Center , No.23, pp.35-49, 1998
- Toshitaka KAMAI : Disaster prevention studies of buried cities, Kyoto University Press
- Keiichiro Nishiwaki : Distribution of raised-bed rivers in the Japanese archipelago and their morphological classification , Geography , 65, 11, pp.102-107, 2020
- Hiroko Fujioka : About the timing of changes in land use of the Sumiyoshi River alluvial fan , Geography Hyogo, 18, pp.31-41, 1974