

## 著作类成果

# 黄河下游河床演变

### 【创新性】

钱宁先生于 1958-1960 年间，在主持《三门峡水库建成后黄河下游河床演变及河道整治的研究》项目中，系统地收集黄河下游水文泥沙和河道资料，广泛调查总结沿河老河工和群众的经验，参阅、考证有关历史文献，浓缩《黄河下游河床演变》一书。全书三单元八章，提出了冲积河流的不平衡性和不稳定性概念；确定了黄河下游不同时期的冲淤变化及其规律性；构建了黄河下游河道冲淤的基本模式；提出了漫滩洪水滩槽泥沙交换机制及其对河道冲淤影响；发现了主槽长距离冲刷和泥沙的长距离输送现象和规律；从流域和河道的特性两方面解释了黄河下游河床长时期内不能保持平衡的原因。把主槽摆动分为两大类型，提出两类“节点”及其在控制、固定河势中的作用，论述了河道游荡的成因，给出了判别河道特性的游荡指标。

主要完成人：钱宁、周文浩

获奖单位：泥沙所

### 【影响力】

《黄河下游河床演变》是钱宁归国后完成的第一本专著，也是我国第一部有关黄河下游河床演变的专著，不仅对治黄提供了理论指导，而且为河床演变学的建立和发展打下了坚实的基础。钱宁形象地把游荡性河段的水流比作一条具有弹性的钢条，一处发生振动，波动就会向上下游传递。如果在钢条中选择几点嵌固起来，限制当地的振动，则钢条的其他部分的振动也会变得低小。节点嵌制越紧，间距越近，则振幅就亦愈小。这套有关节点的概念，很易为治河工作者们接受，节点工程在黄河下游河道整治中早已被广泛使用。



## FLUVIAL PROCESSES IN THE LOWER YELLOW RIVER

### 【 Innovation 】

As the principal investigator during 1958-1960 for the research project of channel processes and training in the lower Yellow River after the construction of the Sanmenxia reservoir, Mr. Chien Ning systematically collected and analyzed the hydrological, sediment and morphological data on the lower Yellow River, summarized abundant practical experiences from local people and river engineers, and critically read relevant historical documents. His research findings were synthesized into a book titled as "Fluvial Processes in the Lower Yellow River" in 1965. This book is composed of three parts and eight chapters. It proposes the concept of disequilibrium and instability applicable to alluvial streams, ascertains the erosion and accretion variations and their laws in the lower Yellow River in different periods, establishes the basic modes of channel evolution, and explores the mechanism for the sediment exchanges between main channel and floodplains during over-floodplain floods and their impacts on fluvial morphology. It also elaborates the phenomena and mechanism for the long-distance erosion and sediment transport in the main channel, and explains the causes for the long-term disequilibrium of channel bed evolution in the lower Yellow River from two aspects of drainage basin features and fluvial processes. Furthermore, this book classifies two types of main channel swinging, puts forward two types of "nodes" in association with their roles in controlling and stabilizing the river regime, expounds the reasons for channel wandering processes, and suggests wandering indexes to judge the channel characteristics.

Main Contributor : Chien Ning, Zhou Wenhao

Award-winning Unit : Department of Sediment Research

### 【 Influence 】

The book "Fluvial Processes in the Lower Yellow River" is Chien Ning's first monograph after he returned to China from USA and also China's first monograph on the morphological evolution in the lower Yellow River. It has not only provided the theoretical guidance for training the Yellow River, but also laid a solid foundation for the establishment and development of fluvial morphodynamics in China. Chien Ning compared the flows within the wandering reaches to an elastic steel rod, along which a vibration that takes place on one point will be propagated to both upstream and downstream. If the vibration is restricted locally by holding on a few selected points on the steel rod, the vibration of the remaining parts will be also reduced. The more tightly the nodes are held on, and the smaller their distances are, the smaller the vibration amplitudes will become. This set of node control concept is easily acceptable by river engineers. Thus, the node control engineering has been widely used in the regulation work in the lower Yellow River.