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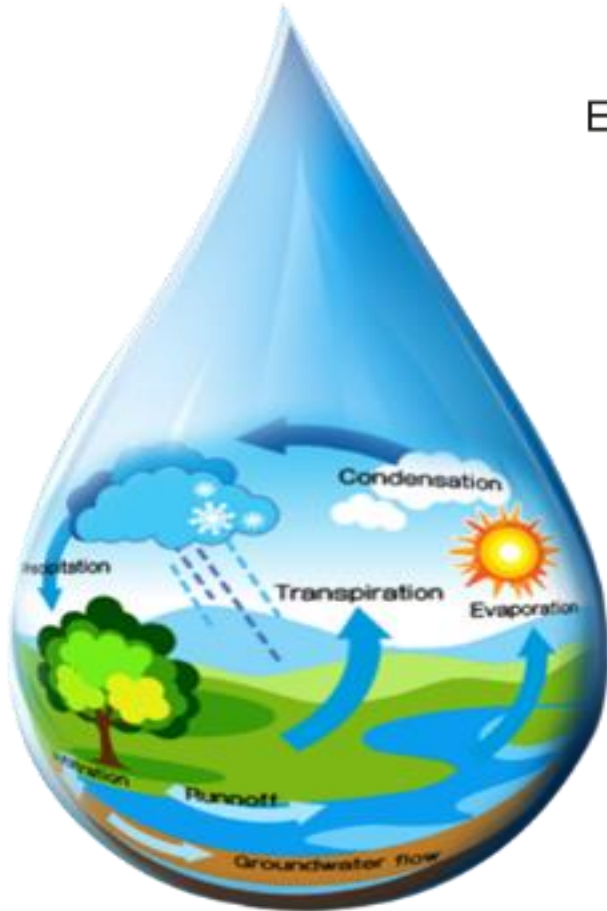
International
Geoscience
Programme



UNESCO
Global
Geoparks

HYDROGEOLOGY

- Geoscience of Water Cycle -



Yongje Kim

Korea Institute of Geoscience and Mineral Resources (KIGAM)



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Hydrogeology Leader

UNESCO » Natural Sciences » Environment » Earth Sciences » International Geoscience Programme » Hydrogeology Leader

Earth Sciences

International Geoscience and Geoparks Programme

International Geoscience Programme

- ▶ IGCP Projects
- ▶ Proposal Submission
- ▶ National Committees
- ▶ IGCP Council

- ▶ Sustainable Development Goals

UNESCO Global Geoparks

Earth Science Education in Africa

Geo-Hazards Risk Reduction

Dr Yongje Kim



Dr Yongje Kim is a principal researcher in the Groundwater and Ecohydrogeology Research Center of the Geologic Environment Division at Korea Institute of Geoscience and Mineral Resources (KIGAM). He received his PhD in Geology (Environmental Hydrogeochemistry) at Texas A&M University, USA in 1995.

During over 20 years of his professional research career, Dr Kim has been the technological and administrative leader for a variety of R&D projects for the Korean Government and from EU and UNESCO in areas of water-resource security. He is a two-time recipient (2006 and 2010) of a Korea Minister's Award (Ministry of Construction & Transportation and Ministry of Education, Science & Technology), and Chairman's Award in National Research Council of

Science & Technology (2016), which recognize his outstanding contributions in the development of novel technologies for the analysis and modeling of groundwater-surface water flow systems and for artificial recharge. He has served as an advisor to the editor-in-chief and associate editor of the NGWA journal Ground Water (2011-2015), and is presently an associate editor for Water Science and Engineering in China (2013- present). He also serves as the Congress Convener for 2018 IAH (International Association of Hydrogeologists) held in Korea.

Dr Kim's service as a representative of CCOP (Coordinating Committee for Geoscience Programmes in East and Southeast Asia) since 2012 as an executive director of Global Cooperation Division at KIGAM has played important roles for prosperity of Asia, in the fields of geosciences including water resources security, water management, capacity building, and especially for encouraging and growing the capabilities of young geologists in Asia. His current research interests revolve around novel technologies for treating non-point source contaminants in urban runoff and integrated technology for securing groundwater/geothermal resources and conserving ecosystems with climate change.



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Hydrogeology Theme

Hydrogeology: Geoscience of the Water Cycle

Life on Earth depends on water and its sustainable use is crucial for continued human existence. Earth's water resources include surface/ground water, ocean water, and ice. The study of Earth's water involves understanding and managing both surface and ground water systems, including sources, contamination, vulnerability and history of water systems.

The projects mainly consider and include

- > Water resources sustainability, assessment, protection, and social services
- > Activities such as workshops, meetings, and training programs
 - to expand the networks between countries and continents
 - to reach issues of global geoscientific interests
 - to ensure the results that meet society challenges



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Hydrogeology Experts

Hydrogeology experts in Scientific Board

- > 11 experts from Africa , America, Asia, Europe (Male: 6, Female: 5)
- > China, DR Congo, Ecuador, Egypt, Hungary, Italy, Russia, Spain, Tanzania, USA, Vietnam

1. Ms Bernal, Isabel Carolina (Ecuador): Geomorphology, Hydrosedimentology
2. Mr Cheng, Zhang (China): Karst hydrogeology
3. Mr Dzhamalov, Roald G. (Russia): Submarine groundwater
4. Ms Fidelibus, Maria Dolores (Italy): Hydrogeology, Environmental geochemistry
5. Mr Ibrahim, Reda Gamil Mohamed (Egypt): Pharmaceutical chemistry
6. Ms Le, Thi Phuong Quynh (Vietnam): Hydrogeochemistry, Biogeochemistry
7. Mr Muxuka, Alfred (Tanzania): Geochemistry
8. Mr Schwartz, Frank (USA): Hydrogeology, Contaminant hydrogeology
9. Ms Szócs, Teodóra (Hungary): Environmental hydrogeology, Hydrochemistry
10. Mr Tshimanga, Raphael (DR Congo): Geographic Information System
11. Ms Vallejos Izquierdo, Angela (Spain): Hydrology, Seawater intrusion

★ Ms Anderson, Mary (USA): Hydrogeology





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Active Projects List

IGCP 643: Water resources in Wet tropics of West–Central Africa (3WCA)

- ▷ Principle Investigator(s): **Kamagate Bamory (Ivory Coast)**, Yalo Nicaise (Benin)
- ▷ Duration and Participants : 2015 – 2019 (5 years), 30 participants
- ▷ Countries involved: Benin, Cameroun, France, Ivory Coast, Niger

IGCP 661: The Critical Zone in Karst Systems

- ▷ Principle Investigator(s): **Jiang Zhongcheng (China)**, Yuan Daoxian (China), Zhang Cheng (China), Jiang Yongjun (China), Martin Knez (Slovenia), Chris Groves (USA), Augusto Auler (Brazil), Bartolome Andreo- Navarro (Spain), Ezzat Raeisi (Iran)
- ▷ Duration and Participants : 2017 – 2021 (5 years), 38 participants
- ▷ Countries involved: Cambodia, China, Egypt, Iran, Myanmar, Romania, Slovenia, Thailand, USA, Vietnam,

IGCP 663: Land Subsidence in Coastal Cities

- ▷ Principle Investigator(s): **Xuexin Yan (China)**, Mahmoud Bakr (Egypt), Luigi Tosi (Italy), Esther Stouthamer (The Netherlands), Heri Andreas (Indonesia)
- ▷ Duration and Participants : 2018 – 2021 (4 years), 94 participants
- ▷ Countries involved: China, Indonesia, Italy, Mexico, Thailand, The Netherlands, USA



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State-of-the-Art, Achievements

IGCP 643: Water resources in Wet tropics of West-Central Africa (3WCA)

Project Aims: The 3WCA project aims to build the capacity of laboratories associated with PICASS'EAU LMI to better predict the responses of water resources to climate change and land use in wet tropics of west-central Africa.

- Support for exchange students
- Support for teacher mobility
- Funding of laboratory equipment
- Help in setting up a new research project

Scientific achievements

- ▷ **WORKSHOP:** Hydrological and hydrogeological modeling and peri-urban water quality
 - Darcy law, diffusivity and Richards equation., boundary conditions
 - Analysis of streamflow variability according to land use-land cover and climate change
 - Sampling and identification of biological communities to assess the ecological quality





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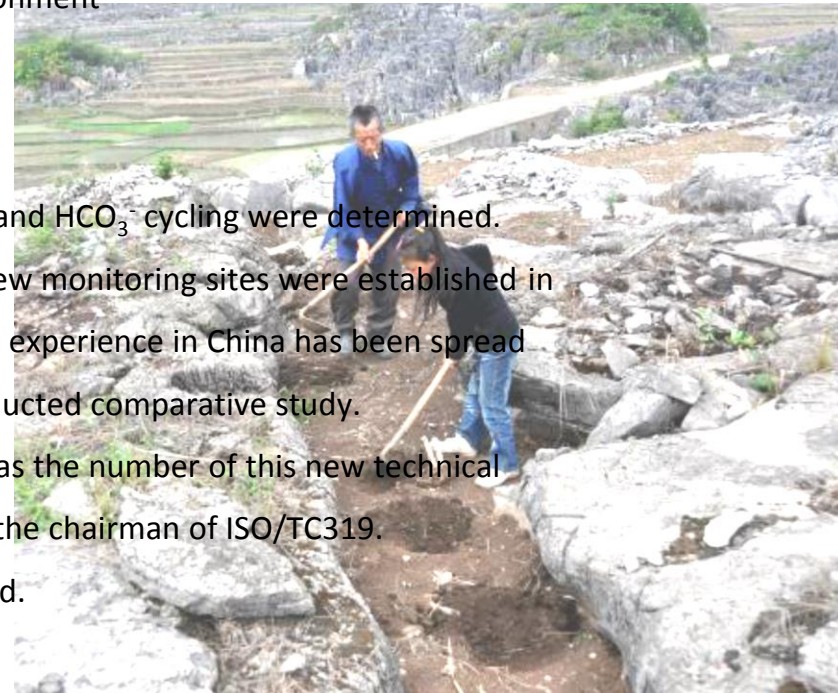
State-of-the-Art, Achievements

IGCP 661: The Critical Zone in Karst Systems

Project Aims: The project pays mainly attention to scientific issues such as the structure, evolution, cycle of carbon-water-calcium and function of the critical zone and its sustainable utilization of the resources and environments. The main purposes of this project are to significantly enhance the research on critical zone science in karst systems, as well as to promote international cooperation and technology sharing on karst environment protection, education and training.

Scientific achievements

- ▷ In various types of karst critical zone, the different forms of calcite and HCO_3^- cycling were determined.
- ▷ The monitoring network on shallow karst critical zone promoted, new monitoring sites were established in tropical, sub-tropical and temperate climatic zones. The monitoring experience in China has been spread to Slovenia, Thailand, and Iran and some other countries have conducted comparative study.
- ▷ An application of standards has been finished, and ISO gave TC319 as the number of this new technical committee. IGCP661 project leader Jiang Zhongcheng is elected as the chairman of ISO/TC319.
- ▷ 1:10,000,000 karst distribution map of the world has been published.





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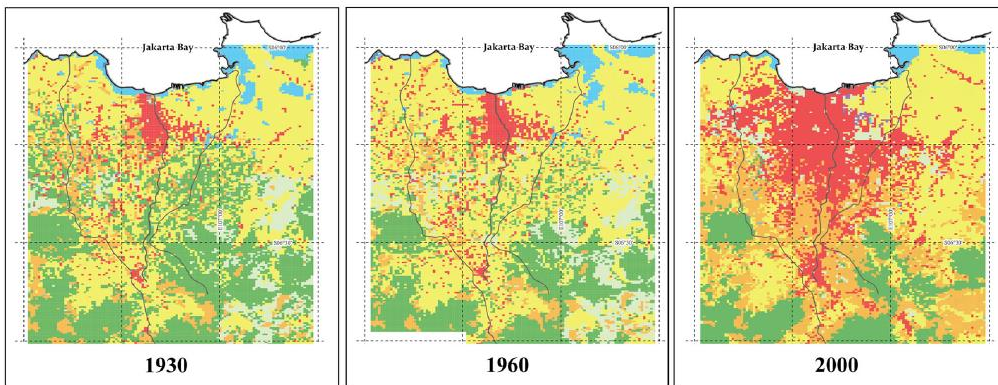
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What are the Challenges

How Urbanization, Poverty and Population are Shaping Groundwater Future

- Sustainability of water resources for sustainable Earth

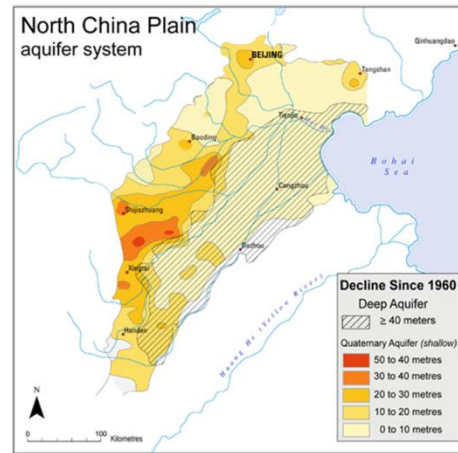
▷ Jakarta, Indonesia



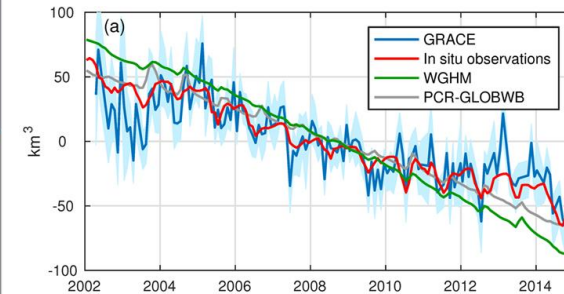
■ Residential area ■ Paddy field ■ Marsh area ■ Grassland/Wasteland
■ Agricultural Field ■ Industrial area ■ Forest ■ Others



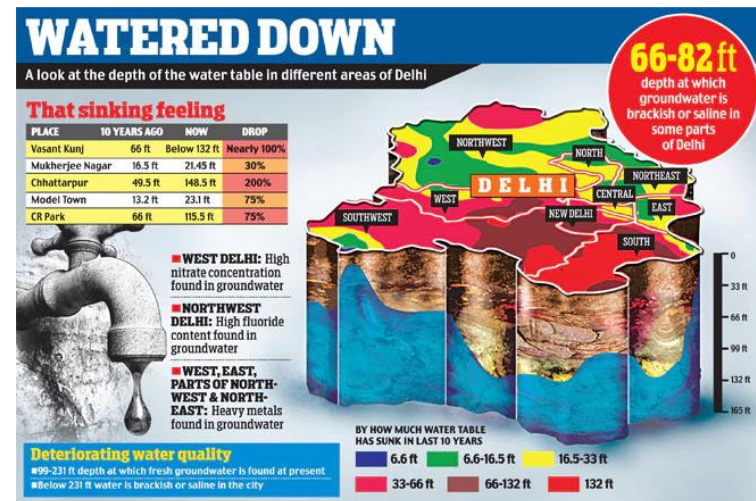
▷ North China Plain, China



Continuing storage depletion
- 7.2 km³/yr (Feng et al., 2018)



▷ Delhi, India





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Sustainable
Development
Goals

THANK YOU !!!

Yongje Kim

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