



SUMMARY OF IGCP 2017 IN HYDROGEOLOGY THEME

F E B R U A R Y 2 0 1 8

IGCP 643: Water Resources in Wet Tropics and West-Central Africa (3WCA)

Duration: 5 years (2015-2020)

Project Aims: The 3WCA project, associated with different laboratories from west-central Africa and France, studies hydrological/hydrogeological variability in relation with climate and land use changes. The primary objectives are to build strong background in international collaboration, in particular (1) support for exchange students, (2) support for the mobility of teachers, (3) financing of laboratory materials, and (4) support for setting new research project. 3 countries in Africa (Benin, Ivory Coast, Niger) and France performed the project.

Related UN SDGs: Goal 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Targets 4.3, 4.7, and 4

Countries involved in the project (17 participants): Cameroon, Benin, France

Scientific activities:

- Remote sensing, geographic information systems (GIS), fieldwork techniques were employed to identify groundwater potential zones.
- International training workshop: Remote sensing as support for hydrological modeling in sub-humid Africa to serve train masters and PhD students

Scientific achievements

- A workshop series has been organized (02-10 Sept. 2017; 02-06 Nov. 2017, and 07-19 Dec. 2017) in Cameroon for master students in "Remote sensing as support for hydrological modelling in sub-humid Africa".
- A wide range of satellite sensors are used to retrieve hydrological-related parameters of vegetation and soil at different scales. These parameters contribute to the water modeling and aquifer assessment.
- Total water storage change in local scale was studied over selected aquifers using in-situ and satellite gravity measurements.
- Groundwater assessment was conducted by integrating the remote sensing products and other ancillary data using EALCO model.

IGCP 661: Structure, Substance Cycle, and Environment Sustainability of the Critical Zone in Karst Systems

Duration: 5 years (2017-2022)

Project Aims: Critical zone means the key sections for interaction among different spheres of earth surface (lithosphere-pedosphere-biosphere-hydrosphere-atmosphere), namely from tree crown, soil to aquifer. Traditional weathering crust is the major component of critical zone. 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.

Related UN SDGs: Goal 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Targets 4.3 and 4.7.

Countries involved in the project (41 participants): China, USA, Slovenia, Thailand, Iran, Cambodia, Finland, Japan, the Philippines

Scientific activities

- IGCP 661 working group meeting: 21 attendances from 5 countries in Kunming, China
- CCOP (Coordinating Committee for Geoscience Programmes in East and Southeast Asia) water resources exploitation and environment protection seminar: 20 attendances from 5 countries in Cebu, Philippines. 10 major cross-border aquifers have been delineated.
- Training course on hydrogeology, environmental geology and ecological geology of karst was organized to develop the capabilities of young karst geologists.

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Scientific achievements

- An initial partition of karst critical zone has been finished based on different climate zones covering the karst areas studied.
- The cycle and transformation of C and N has been tested in a shallow karst critical system from plants to the water and soil.
- A standard working methodology in karst geology has been finalized and accepted in China which will be developed and submitted to the International Standardization Organization (ISO).
- The scientific achievements can be used as a tool to characterize karst systems globally and to help understand the cycle and transformation of elements in the rock-soil-water system in karst systems.
- Five (5) publications in peer-reviewed journals including Biology & Fertility of Soils.

New call for IGCP Project Proposal:

1. Project theme: Groundwater sustainability in volcanic regions.
2. The call will emphasize that women and young and early career scientists are especially encouraged to apply.
3. The project(s) will be sponsored by Jeju Province Development Corporation (JPDC) Korea for five (5) years.

Support to Stable Isotope Analyses for Djibouti Research Center and Studies

1. Purpose: The complex coastal aquifer has not well studied in despite that it is the only aquifer systems that deserve water to the Djibouti-city, which is the capital of the Republic of Djibouti and where 60% of the population of the country lives. Therefore, the study of this aquifer system is of paramount importance for the capital city of Djibouti for a better management of this aquifer system. This coastal aquifer system experienced seawater intrusion concomitant to an over-exploitation as well as a pollution from a dumping site that they suspect some leak. Therefore, they have undertaken the current research and would like to complete their study by the analyses of isotopes.

2. Request via UNESCO IGCP program: Stable isotope analyses including 2H, 18O, 13C, 34S-SO₄, 18O-SO₄, 15N-NO₃, and 18O-NO₃.

3. Analyses performed by:

- KIGAM (Korea Institute of Geoscience and Mineral Resources and
- KBSI (Korea Basic Science Institute)