Valens Hishamunda, Ph.D.
Postdoctoral Research Associate,
Institute for Water Resources Science and Technology,
College of Arts and Sciences,
Texas A&M University–San Antonio
♦ (210) 404 3833 ♦ hivalens@gmail.com/
vhishamunda@tamusa.edu

Areas of Expertise

- Aqueous Geochemistry
- Environmental chemistry

Education

- Ph.D. Aqueous & Isotope Geochemistry, Indian Institute of Science, India (2021)
- M.S. Geology, Annamalai University, India (2015)
- B.Sc. Environmental Chemistry, National University of Rwanda (2011)

Academic/Professional Appointments

- Postdoctoral Research Associate, College of Arts and Sciences, Texas A&M University – San Antonio, U.S.A., Nov. 2021 – August 31, 2022.
- Research Associate, Centre for Earth Sciences, Indian Institute of Science, India, Aug. 2021 – Oct. 2021

Teaching Experience

- Aug. 2019 – Dec. 2019: Teaching assistant for Origin and Evolution of Earth, Centre for Earth Sciences (CEaS), Indian Institute of Science, Bangalore, India.
- Aug. 2018- Oct. 2021: Training Junior Research Fellows (Ph.D students) in maintaining and operating analytical facilities: Quadrupole-ICP-MS, X series 2 and Thermal Ionization Mass Spectrometer (MC-TIMS, Triton Plus) and preparation of samples in geochemistry lab (10 k and 100 k rooms) with HEPA filters.
- May. 2012- June 2013: Teacher of chemistry at High school (9 to 12 grade), College Saint Bernard Kansi, Rwanda.
- Jan. 2006- Sept. 2007: Teacher of Chemistry and Biology at Ordinal level (7 to 9 grade): Bishyiga Secondary School, Rwanda
SELECTED RESEARCH/PROJECT EXPERIENCE

Project 1: “A Geochemical and Sr, Ca, Mg, Li isotopic study of the Godavari River draining the Deccan basalts”

URI: https://etd.iisc.ac.in/handle/2005/5243

- Work conducted by Valens Hishamunda
- Project Manager: Valens Hishamunda
- Supervisor: Prof. Ramananda Chakrabarti,
- Centre for Earth Sciences (CEaS), Indian Institute of science (IISc.), Bangalore, India.

- Conducting 6 sampling campaigns of surface and groundwater samples in upper 700km of the Godavari River
- Constrain sources of ions based on major ion chemistry and quantify CO₂ consumption flux due to basalt weathering in the Deccan (0.77 x 10¹² mol. C. yr⁻¹) and its global contribution (6%).
- The riverine δ⁴⁴/⁴⁰Ca SRM95a values (0.59‰ to 0.89‰) in the upper reaches of the Godavari River are controlled by basalt weathering while the high δ⁴⁴/⁴⁰Ca (1.1 to 1.64‰) suggest groundwater discharge and to less extent calcite precipitation.
- Large variability of Ca isotopic composition (0.51 to 1.61‰) of bi-weekly water samples from a single location in the upper reaches over 14-month period is controlled by selective weathering of minerals a and calcite precipitation.
- Large range of δ⁷Li (4.24‰ to 31.17‰) reflect effect of congruent versus incongruent weathering of basalts, while the limited variability of δ²⁶Mg (-0.56‰ to -0.29‰) suggest dissolution of Mg-bearing minerals in the deccan basalts.

Project 2: “Natural Sources and Anthropogenic Influences on the River Water and Groundwater Chemistry of the Lower Mahanadi Basin: Insights from Radiogenic Sr Isotopes and Major Ion Chemistry”

DOI: https://doi.org/10.3389/frwa.2022.846438

- Work conducted by Shiba Acharya and Valens Hishamunda
- Project Manager: Shiba Acharya.
- Supervisor: Prof. Ramananda Chakrabarti, CEaS, IISc., India

- Demonstrated that the major ion chemistry in the Mahanadi River is less affected by anthropogenic pollution (pollution index < 20%) despite presence of major industries.
- Major ion chemistry and ⁸⁷Sr/⁸⁶Sr of the river water samples indicate that seasonally mediated carbonate dissolution and silicate weathering modulate the chemistry of the Lower Mahanadi River Basin as demonstrated by both Forward and inverse models.
- A strong relationship between the PO₄³⁻ and ⁸⁷Sr/⁸⁶Sr was observed in the samples collected during the monsoon season, suggesting significant contributions from fertilizers to the river water.
- The groundwater composition of the Lower Mahanadi Basin is modulated by the mixing of weathering of silicate and carbonate rocks, the mixing of Bay of Bengal seawater and fertilizer inputs.
- Most of the groundwater samples are characterized by Ca-Mg-Na-HCO₃ and Na-Mg-Ca-Cl compositions, characteristic of coastal groundwater and seawater intrusion, respectively.
GRANTS SUBMITTED

Title: “The role of microbial activities in the mobilization of organometal(loid)s in the earth critical zone: Case of a karst watershed”

- Dr. Valens Hishamunda: designed, conceptualized, and wrote the project
- Dr. Pride T. Abongwa (PI) and Dr. Davida Symth (Co-PI), both faculties at TAMUSA: edit and supervise the project
- Funding Agency: submitted to National Science Foundation (NSF)

PUBLICATIONS

Manuscripts in preparation

- **Valens Hishamunda**, Ramananda Chakrabarti, Sambuddha Misra, Alexandra Turchyn., 2022. Large variability in $\delta^{44/40}$Ca in the Godavari River, India due to basalt weathering and groundwater mixing: implications for seawater Ca isotopic composition. (*Under review, Chemical Geology*).
- **Valens Hishamunda**, Ramananda Chakrabarti, Jean Riotte., Temporal variation in major ion chemistry, $^{87}$Sr/$^{86}$Sr and $\delta^{44/40}$Ca of the Godavari River at Nashik, India: implication for selective mineral weathering in basalts (*under prep.*)
- **Valens Hishamunda**, Ramananda Chakrabari, Jean Riotte., Geochemical and strontium isotopic composition ($^{87}$Sr/$^{86}$Sr) of the Godavari River draining the Deccan basalts: understanding basalt weathering, and associated atmospheric CO$_2$ removal (*under prep.*)

Published Journal Articles

- Shiba Shankar Acharya, **Valens Hishamunda**, Ramananda Chakrabarti., 2022. Natural sources and anthropogenic influences on the river water and groundwater chemistry of the Lower Mahanadi Basin: Insights from radiogenic Sr isotopes and major ion chemistry (*Published on April 19, 2022, Frontiers in Water, Earth and Climate, https://doi.org/10.3389/frwa.2022.846438*)

SELECTED CONFERENCE PRESENTATIONS

- Geochemical and isotopic composition in Godavari River draining Basalt: understanding the rate of chemical weathering of basalt and CO$_2$ removal. National Seminar, Pondicherry University, India, February 8$^{th}$ to 9$^{th}$, 2018. (1st award oral presentation)
- Geochemical and stable Ca and radiogenic Sr isotopic composition of the Godavari River draining basalts. Fall meeting Goldschmidt, Barcelona, Spain 18-23 August, 2019. Poster presentation by Valens Hishamunda. (Prestigious award of Travel Grant by European Association of Geochemistry)
- Temporal variation in major ion chemistry and strontium isotopes of Headwater of Godavari, Fall meeting Goldschmidt (virtual), June 21-26, 2020, Hawaii, USA (oral presentation by Hishamunda Valens).
- Participation in Virtual Goldschmidt conference, Lyon, France, from 28 June to 9 July, 2021
Invited Presentations

- **Topic**: “Understanding basalt weathering and removal of atmospheric CO₂ from water chemistry”, March 25th, 2022.
- Invited by: **Department of Geology, College of Science and Technology, University of Rwanda**

AWARDS AND ACCOMPLISHMENTS

- First award oral presentation at National conference, Pondicherry University, India
- Travel grant by Goldschmidt conference 2019

SKILLS

- **Analytical Instruments**: 6 years of experience (Aug. 2015- Nov. 2011) in operating Quadrupole-ICPMS, X series 2 and Thermal Ionizations Mass Spectrometer (TIMS, Triton Plus)
- 6 years’ experience of working in Geochemistry Clean Lab (10 k and 100k rooms) for sample preparation
- Expertise in leading field sampling campaigns for river water, groundwater, rocks and bed sediments samples
- **Basic Skills in** PHREEQC Software; Geochemist’s WorkBench Community Edition; Word, excel, power point, origin pro, sigma plots, CorelDRAW.

Affiliation

- Geochemical Society
- European Association of Geochemistry

Valens Hishamunda