



Joint European Stable Isotope User Meeting 2022

UNIVERSITY OF
EASTERN FINLAND
Kuopio, Finland

10–14 October 2022

(Scientific programme–vers. 1)

“The important thing is to never stop questioning” (Albert Einstein)

JESIUM 2022

Sunday 09.10.2022

18:00 h — ICEBREAKER, KUOPIO CITY HALL

Day 1, Monday 10.10.2022

08:00–08:30

Opening

Session 1: Methodological Advances (chairs: Harro Meijer & Pascal Boeckx)

08:30–09:00

Senior keynote: Thomas Röckmann: Possibilities, experiences and applications: the Thermo 253 ultra

9:00–9:15

Christian Ostertag-Henning: Raman spectroscopy as a tool to quantify the (relative) abundances of isotopologues of CO₂, experiences and applications: the Thermo 253 ultra

9:15–9:30

Chris Rennick: Calibration of a preconcentrator and laser spectrometer for $\delta^{13}\text{C}(\text{CH}_4)$ and $\delta\text{D}(\text{CH}_4)$ measurement in ambient air

09:30–9:45

Anita Aerts-Bijma: Where do IRMS's go wrong? $\delta^{18}\text{O}$ SLAP determined at -56.3 ‰

9:45–10:15 BREAK

10:15–10:45

Junior keynote: Lukas Flierl: Absolute Isotope Ratios

10:45–11:00

Caroline Gauchotte-Lindsay: RGC-based concentration, pyrolysis and trapping prep-system for position specific stable isotope analysis

11:00–11:15

Francois Fourel: $\delta^2\text{H}$ measurements with various EA-IRMS techniques: a review. New application to archaeological mineralised tissues

11:15–11:30

David Dettman: Tunable infra-red laser differential absorption spectroscopy (TILDAS) measurement of multiple clumped isotope ratios in carbonates: progress and new horizons

11:30–11:45

Xuefei Li: Belowground Methane Turnover at a Boreal Peatland: Quantifying the Processes with in-situ Stable Isotope Methods

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Session 2: Terrestrial & Aquatic Biogeochemistry (chairs: Christina Biasi & Tobias Rütting)

11:45–12:15

Senior keynote: Wolfgang Wanek: Nitrogen isotope fractionation to inform on controls of soil nitrogen cycle processes

12:15–12:30

Wenzel Gruber: Tracing N₂O formation in full-scale wastewater treatment with natural abundance isotopes

12:30–12:45

Kirstin Dähnke: Nitrogen isotopes reveal a particulate-matter driven biogeochemical reactor in a temperate estuary

12:45–14:00 Lunch

14:00–14:15

Michaela Dippold: Belowground C allocation of tropical rainforests in response to drought: an ecosystem ¹³C₂ labeling experiment

14:15–14:45

Junior keynote: Isabell Klawonn: Tracing carbon and nitrogen cycling pathways within microbial plankton communities: from single-cell to mesoscale processes

14:45–15:00

Tuula Larmola: Mosses as biofilters for ditch methane emissions from forestry drained peatlands

15:00–15:15

Travis Meador: Stable Hydrogen and Oxygen Isotope Ratios of Dissolved Organic Matter in Inland Waters

15:15–15:30

Hans Hermann Richnow: Characterizing the transformation of hexachlorocyclohexane in soil-plant systems from lab to field scale using multi-element compound specific isotope analysis

15:30–15:45

Dominika Lewicka-Szczebak: Combining isotope mixing and fractionation with a new modelling tool applying the Monte Carlo approach

15:45–16:00 Short Break

Session 5: Health & Medical Sciences (chair: Douglas Morrison)

16:00–16:30

Keynote: to be announced

16:30–16:45

Ricardo Fernandes: Tracking nutrient metabolic pathways and detecting protein malnutrition using isotopic tracers

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16:45–17:00

Thomas Piper: Development of mass spectrometry-based methods for the detection of 11-ketotestosterone, a novel doping agent

17:00–17:15

Harro A.J. Meijer: First Use of Triply Labelled Water analysis for energy expenditure measurements in mice

17:15–17:30

Noreen Tuross: Changes in the Nitrogen Isotope Composition of Serum Amino Acids in a Longterm Feeding Trial

17:30–19:00 Poster session 1

Day 2, Tuesday 11.10.2022

Session 11: Molecular & Intramolecular Biology (chairs: Marja Tirola & David Berry)

08:30–09:00

Senior keynote: Nico Jehmlich: Tracing incorporation the metabolic activity in microbiomes using protein-based stable isotope probing (protein-SIP)

9:00–9:15

Anca Amariei: Position-Specific Isotope Analysis in Hopanoid Lipids

9:15–9:30

Henri Siljanen: Methanotrophy by putative monooxygenase in boreal spruce phyllosphere

9:30–10:00

Junior keynote: Fatima Pereira: “Raman-stable isotope probing (SIP) approaches to study microbiome function at the single-cell level”

Session 4: Paleoclimatology & Archeology (chairs: Marcel van der Meer & Maria Lahtinen-Kaislaniemi)

10:00–10:30

Senior keynote: Kerstin Lidén: How strontium isotopes have been to used and abused in archaeology

10:30–10:45

Carlo Cocozza: Bayesian uncertainty estimates for Atomic C:N Ratios in Archaeological Collagen

10:45–11:15 Break

11:15–11:30

Marieke Vannoorenberghe: Unravelling dietary aspects of Late Mesolithic to Early/Middle Neolithic cultures in the Scheldt river valley, Belgium, by compound-specific ^{13}C analysis

11:30–11:45

Markus Fjellström: Historic reindeer mobility in northern Sweden – a study of diet, mobility, and climatic changes by multiple stable isotope analysis

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11:45–12:15

Junior keynote: Julie Lattaud: Changes in snow meltwater uptake by plants in the Mackenzie River Delta? Insight from compound-specific isotopes.

12:15–12:30

Raminta Skipityte: Stable isotopes tell the dietary history of the last two millennia Lithuanian inhabitants

12:30–12:45

Sean Hixon: Environmental and Anthropogenic Effects on Plant Amino Acid Nitrogen Isotope Values

12:45–14:00 Lunch

14:00–14:15

Kerstin Treydte: European summer vapor pressure deficit of the last 400 years reconstructed from a tree-ring oxygen isotope network

14:15–14:30

Abdur Rahman: Reconstruction of the environment and biogeochemistry of high altitude Himalayan Lake, existed during 33-7 ka, using stable isotopes systematics

14:30–14:45

Clément Massé: Long- and short-term dietary shifts in a generalist predator, the wolverine (*Gulo gulo*) over a century of change.

Session 6: Food Authenticity, Nutrition, Forensic (chairs: Federica Camin & Annikki Welling)

14:45–15:15

Keynote: Simon Kelly: Food safety and traceability

15:15–15:30

Micha Horacek: Species identification of ivory by stable isotope investigations

15:30–15:45

Silvia Pianezze: Characterisation of beef coming from different European countries through stable isotope (H, C, N, S and Sr) ratio analysis

15:45–16:00

Dana Alina Magdas: Optimized data processing tools for enhancing the performances of honey recognition models starting from the isotopic and elemental fingerprint

15:15–15:30

Kurt Krammer: Stable isotope investigations to control of declared geographic origin of Austrian and Slovak apricots, and apricots from other countries

15:30–15:45 Short Break

Sponsor session

15:45–16:00

Sukanya Sengupta, Thermo Fisher Scientific: Workflow advancements in high precision $\delta^{18}\text{O}$ analysis of water by means of low-T $\text{CO}_2\text{-H}_2\text{O}$ equilibration

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16:00–16:15

Calum Preece, Elementar UK Ltd: Analysis of dissolved nitrate stable isotopes using the one-step Ti (III) reduction method and iso FLOW GHG headspace analyzer

16:15–16:30

David Dettman, University of Arizona & David Nelson, Aerodyne Research, Inc.: Tunable infra-red laser differential absorption spectroscopy (TILDAS) measurement of multiple clumped isotope ratios in carbonates: progress and new horizons

16:30–16:45

Magdalena E. G. Hofmann, Picarro B.V. Improved throughput for $\delta^{18}\text{O}$ and δD measurements of water with Cavity Ring-Down Spectroscopy

16:45–17:00

Joanne Shorter, Aerodyne Research, Inc.; Integration of Laser Spectrometers with Diffusive In Situ Probes for Real Time Monitoring of Isotopes and Isotopologues of Soil Gases

17:00–17:15

Nina Albrecht, Thermo Fisher Scientific: The analysis of clumped isotopes in various gas species and fresh insights into petroleum and atmospheric research

18:45 CONFERENCE DINNER

Day 3, Wednesday 12.10.2022

Session 7: Atmospheric Sciences (chairs: Joachim Mohn & Caroline Buchen-Tschiskale)

8:30–9:00

Senior keynote: Jan Kaiser: Polyisotopocules for atmospheric chemistry

9:00–9:15

Sara M Defratyka: Verification of method used to determine $\delta^{13}\text{CH}_4$ during mobile vehicle-based methane measurements

9:15–9:30

Tim Arnold: Measuring and modelling four isotopologue ratios of methane in the atmosphere

9:30–9:45

Alice Drinkwater: Global and Regional Trends in CH_4 and $\delta^{13}\text{C}$ from 2004 to 2020

9:45–10:15

Junior keynote: Wendell W. Walters: Evaluating the Atmospheric Dynamics of Nitrate in New England in Response to Emission Regulations: Utilizing Novel Isotope Observations

BREAK 10:15–10:45

10:45–11:00

Sarah Albertin: Diurnal variations in N and O isotopes of atmospheric nitrogen dioxide and nitrate

11:00–11:15

Vidmantas Remeikis: Isotopic ratios of aerosols for air pollution observation and its assessment as source indicators

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11:15–11:30

Axel Horst: Stable chlorine isotopic composition of CH₃Cl and CFC-12 in tropospheric air samples

11:30–11:45

Sanjeev Dasari: A potential proxy for tracing ozone layer depletion events–sulfur isotope anomalies($\Delta^{33}\text{S}$) in polar ice cores

12:00–13:30 Lunch

AFTERNOON: SIDE EVENTS

Day 4, Thursday 13.10.2022

Session 3: Plant Ecophysiology (chairs: Jaleh Ghashghaie & Thorsten Grams)

8:30–9:00

Senior keynote: Lisa Wingate: Using stable isotopes to probe the carbon and water cycle

9:00–9:15

Christiane Werner: Tracing carbon, water and VOC fluxes through soil-plant-atmosphere by ecosystem ¹³C₂O₂ and ²H₂O Pulse-Labeling during drought and recovery

9:15–9:30

Ansgar Kahmen: Accounting for the metabolic component in the hydrogen isotopic composition of plant carbohydrates

9:30–9:45

Katja Rinne-Garmston: Interpretation of intra-annual tree-ring $\delta^{13}\text{C}$ profiles of control, droughted and re-watered Scots pines

9:45–10:00

Yang XIA: Impact of varying NH₄⁺:NO₃⁻ on C-isotope composition of leaf- and root-respired CO₂ and putative respiratory substrates in *Phaseolus vulgaris* L.)

BREAK: 10:00–10:30

10:00–10:30

Junior keynote: Philipp Giesemann: Green plants are not as green as they seem to be. Are half of the plant kingdom potentially cheating on their fungal partners?

10:30–10:45

John Marshall: Monitoring passage of a point-based label of ²H₂O through the soils and stems of a boreal pine forest

10:45–11:00

Olli-Pekka Tikkasalo: Interpreting tree ring carbon and oxygen isotopes as a response to selection harvest in a drained peatland forest

11:00–11:15

Kyohsuke Hikinō: Carbon transport and allocation of mature Norway spruce during recovery from five years of repeated summer drought

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11:15–11:30

Jeffrey Welker: Geometrid moth outbreaks alter understory plant nutrient and carbon dynamics in northern Finland's mountain birch forest.

Session 9: Isoscape, Spatial Variability of Stable Isotopes (Migration, Food Webs) (chairs: Loïc Michel & Mikko Kiljunen)

11:30–12:00

Senior keynote: Clive Trueman: title to be announced

12:00–12:15

Esther Cepeda Gamella: Towards fouling fauna fingerprinting: what is their contribution to the marine organic matter pool of an offshore wind farms?

12:15–12:30

Clément Massé: Long- and short-term dietary shifts in a generalist predator, the wolverine (*Gulo gulo*) over a century of change

12:30–12:45

Tamara Ann Hiltunen: Stable isotopes provide a window into the diets of Eurasian reindeer at different temporal and spatial scales

12:45–14:00 Lunch

14:00–14:30

Junior keynote: Doreen Kohlbach: Using stable isotope approaches to distinguish carbon sources in marine food webs

14:30–14:45

Amanda Ziegler: Seasonal and spatial variability of pelagic-benthic coupling strength in the Northern Barents Sea: A benthic food web approach

14:45–15:00

Philip Riekenberg: Reconstructing the diet, trophic level and migration pattern of mysticete whales based on baleen isotopic composition

15:00–15:15

Andrea Walters: Body size and depth drive trophic functioning: a case study of the English Channel-Celtic Sea continuum

15:15–15:30

Antti Eloranta: The variable food webs in cold-water lakes

15:30–15:45 Short Break

Session 10: Geochemistry and Hydrology (chairs: Dirk Sachse & Ansgar Kahmen)

15:45–16:15

Senior keynote: Matthias Sprenger: title to be announced

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16:15–16:30

Daniel Nelson: Using machine learning to generate historic European monthly precipitation isotope time series from the 20th century to present day

16:30–16:45

Rohana Chandrajith: Delineating irrigation return flows and seawater intrusion in coastal karstic aquifers by solutes and stable isotopes

16:45–17:00

Theis Winter: New insights into the paleoclimate and recharge history of the Upper Jurassic aquifer using noble gas infiltration temperatures and ^{14}C DOC.

17:00–17:15

Bibhasvata Dasgupta: Atmosphere-Cryosphere coupling processes—a closer look into High Mountain Hydrology

17:15–19:00 Poster session 2

Day 5, Friday 14.10.2022

Session 10: Geochemistry and Hydrology (chairs: Dirk Sachse & Ansgar Kahmen)

8:30–9:00

Junior keynote: S. Nemiah Ladd: Resolving hydroclimate signals from ecological shifts using H isotopes of concurrent lipid biomarkers

9:00–9:15

Evan James Wilcox: Exploring the influence of lake and watershed properties on lake water balances with water isotopes in the Canadian Arctic

9:15–9:30

Christin Müller: High frequency isotope monitoring for assessing hydrological extremes in the mesoscale Bode river catchment, Germany

9:30–9:45

Haiyan Yu: Multi-element Compound-Specific Stable Isotope Analysis (^2H , ^{13}C , $^{33}/^{34}\text{S}$) to characterize the mechanism of sulfate and hydroxyl radical reactions with benzothiazole

9:45–10:00

Paul Koeniger: Stable isotope studies (d^2H , d^{18}O) of soil water movement in spruce and beech ecosystems at Solling, Germany

Session 8: Soil Carbon and Nitrogen Cycling (chairs: Kristiina Karhu & Marja Maljanen)

10:00–10:30

Senior keynote: Christopher Poeplau: Five years of experience with the ^{18}O Carbon Use Efficiency for understanding microbial physiology as a key driver of soil carbon cycling

BREAK: 10:30–11:00

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11:00–11:15

Pauline Sophie Rummel: Increased C and N turnover after litter addition alters contribution of nitrification and denitrification to NO and N₂O formation

11:15–11:30

Rob Roscioli: Real-time mapping of subsurface nitrous oxide isotopes and other trace gases from diffusive gas probes under a cattle grazing pasture

11:30–12:00

Junior keynote: HemRaj Bhattarai: Stable isotope approaches to identify HONO production mechanisms from soils

12:00–12:15

Caroline Buchen-Tschiskale: Tracing nitrogen transformations induced by ¹⁵N labelled cattle slurry applied with different techniques in winter wheat

12:15–12:30

Shasha Zhang: Continental-scale effects on the natural ¹⁵N abundance of plants and soils and isotope fractionation

12:30–12:45

Mengru Jia: How deadwood changes gross nitrogen turnover in two European forests: Insights from an 8-year common garden experiment

12:45–13:00

Marie Spohn: Nitrogen but not phosphorus addition affects symbiotic N₂ fixation by legumes in natural and semi-natural grasslands located on four continents

13:00–13:15

Angela Martin-Vivanco: Direct effects of temperature on the balance between priming and entombing effects under controlled conditions

13:15–14:30 Lunch

14:30–15:30:

Wrap up of JESIUM 2022

END OF JESIUM2022