

# ISO-TOPICS: THE FIRMS NETWORK NEWSLETTER

May 2026

## ABOUT US

The Forensic Isotope Ratio Mass Spectrometry (FIRMS) Network was founded to develop the scope of stable isotope techniques in forensic applications.

FIRMS brings together chemists, physicists, materials scientists, and life scientists who employ isotopic analysis in their respective fields. FIRMS is helping to focus collective knowledge and expertise on improving methods for crime detection and reduction.



Forensic Chemistry

*Proceedings of the 9th Conference of the Forensic Isotope Ratio Mass Spectrometry Network will be published in Forensic Chemistry.*

## WELCOME

Welcome to the FIRMS May 2026 newsletter. To provide feedback on this newsletter, please contact us at [news@forensic-isotopes.org](mailto:news@forensic-isotopes.org)

## DISCLAIMER

Reference to or mention of any commercial product or process by specific trademark or manufacturer within this newsletter does not necessarily represent an endorsement by the FIRMS Network.

## CALL FOR PAPERS - FIRMS 2025

A reminder that submissions are now being accepted for publication in a **Special Issue of Forensic Chemistry** for FIRMS 2025. The submission deadline is 01 July 2026. The guest editor is Dr. Glen P. Jackson.

---

*The deadline for submitting a manuscript for the  
FIRMS 2025 special issue is 01 July 2026!*

---

To prepare your manuscript, please refer to the Guide for Authors and select the article type 'VSI: 9th FIRMS Conference' when submitting your manuscript online. Both the Guide for Authors and the submission portal can be found here: <https://www.sciencedirect.com/journal/forensic-chemistry>

## UPDATES FROM THE STEERING GROUP

The Steering Group is pleased to report that the operation and management of the FIRMS Network Ltd has been **certified as conforming to the international standard ISO9001** for another three years, a certification it has held since 2011. Special thanks to Quality Manager Sean Doyle for overseeing this certification effort.

From Chair Phil Dunn and Director Jim Carter:

The international measurement standard for nitrogen isotope delta is atmospheric nitrogen. This is often referred to as Air-N<sub>2</sub>, N<sub>AIR</sub>, N<sub>2 AIR</sub>, or simply Air. **“Air” in this context is simply air; it is not an acronym** unlike

some other international reference materials such as VSMOW (Vienna Standard Mean Ocean Water), VPDB (Vienna Pee Dee belemnite), or VCDT (Vienna Cañon Diablo troilite).

There are instances in the literature describing the nitrogen isotope delta measurement standard as “AIR” being an abbreviation for “ambient inhalable reservoir” or “ambient inhalable reference.” One possible origin of these incorrect acronyms was noted by a reviewer of an article submitted to the journal *Geochronology* (<https://doi.org/10.5194/gchron-7-583-2025>). The open review of Reviewer 1 has the following within their comment on line 100 of the submission:

*...and once and for all: AIR is not an acronym, it is just air. The standard is Atm. N2. I.e., the d15N value of all N2 in all the air everywhere on earth is 0 per mille. “Ambient Inhalable Reservoir” is a stupid joke that Henry Schwarcz or somebody made to an archaeologist in the 1980s and the archaeologist thought they were serious. Everyone else did an emperor’s new clothes after that because they didn’t want to look ignorant while “doing isotopes”.*

---

### *A reminder that the measurement standard Air is not an acronym!*

---

Incidents of this misuse are small (certainly in comparison to the numbers of papers reporting nitrogen isotope-delta values) and mostly occur in papers reporting isotopic analyses in archaeological contexts. This would appear to support Reviewer 1 as being at least pretty close to the truth.

## NEWS AND NOTICES

Hurry: Registration closes 29 May for the **Advances in Stable Isotope Techniques and Applications (ASITA)** Conference. This year ASITA is 7-10 June 2026, at the University of Saskatchewan (Canada).

The **14<sup>th</sup> International Conference on the Applications of Stable Isotope Techniques to Ecological Studies (IsoEcol)** will take place in Hong Kong, from 12 to 17 October 2026.

The University of Wisconsin-Madison (USA) is hosting **Isotope Fingerprints: Global Science Insights Conference 2026**, a multidisciplinary meeting highlighting the power of stable isotopes across environmental, ecological, forensic, and food & agricultural sciences. The meeting is scheduled for 11-13 November 2026.

## HIGHLIGHTED PUBLICATIONS

An open access article published in 2025 (DOI: 10.1002/rcm.10018) discussed the existence and use of two carbon isotope delta scales, the VPDB scale and the VPDB-LSVEC scale. Following this, two recent papers by Chartrand et al. and Moossen et al. have reassessed the  $\delta^{13}\text{C}$  values of various reference materials on the VPDB scale. These publications are marked with an asterisk (\*) in the below list.

A new spreadsheet for calculating measurement uncertainty in stable isotope delta values has been published by Paul Szpak and is now available for use: <https://doi.org/10.1016/j.jas.2025.106457>

## PUBLICATIONS LIST

*Disclaimer: This section contains a non-comprehensive list of recent publications that may be of interest to members. Inclusion does not necessarily mean that the FIRMS Network approves the content. You are encouraged to consider critically whether (i) the experimental work complies with SI guidelines and the Good Practice Guide; and (ii) the conclusions drawn are based on sound scientific background information.*

Agrawal G, Ghosh M, Sanyal P (2026) A validated one-stop resource for oxygen isotope analysis of human scalp hair. *Forensic Science International: Reports* 13:100461. <https://doi.org/10.1016/j.fsir.2026.100461>

Balzani P, Meador T (2026) Does mill-grinding affect stable C and N isotopic analysis of animal tissues? *Isotopes in Environmental and Health Studies* 1–9. <https://doi.org/10.1080/10256016.2026.2662051>

Batista ACG, Araújo MGDS, Souza-Silva IM, et al (2026) Isoscape of oxygen stable isotopes in woods of the Amazon. *Molecules* 31:1542. <https://doi.org/10.3390/molecules31091542>

Batista ACG, Silva IMS, Silva Araújo MGD, et al (2025) Within- and between-site variability of  $\delta^{18}\text{O}$ ,  $\delta^{13}\text{C}$ , and  $\delta^{15}\text{N}$  in Amazonian tree rings: Climatic drivers and implications for geographic traceability. *Forest Ecology and Management* 597:123168. <https://doi.org/10.1016/j.foreco.2025.123168>

Brasileiro L, Costa FJV, Ramos PRR, et al (2026) Stable isotope analysis as a tool to prevent illicit wildlife trade of songbirds in Brazil. *Animal Conservation* acv.70052. <https://doi.org/10.1111/acv.70052>

\*Chartrand MMG, Hélie J, Adamowicz-Walczak A, et al (2026) Bridging VPDB and VPDB-LSVEC: Updated carbon isotope delta values and improved uncertainties for NRC certified reference materials. *Rapid Communications in Mass Spectrometry* 40:e70077. <https://doi.org/10.1002/rcm.70077>

Chartrand MMG, Yang L, Methven B, et al (2026) Characterization of trace element impurities and carbon isotope delta in HIPC-1, a high-purity graphite certified reference material. *Analytical and Bioanalytical Chemistry* <https://doi.org/10.1007/s00216-026-06428-y>

Ehleringer JR, Howa JD (2026)  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values of residues provide insights into identification of the explosive source. *Rapid Communications in Mass Spectrometry* 40:e70057. <https://doi.org/10.1002/rcm.70057>

Gaillard A, Neuner A, Landgraf J, et al (2026) Groundwater stable isotope maps for Germany: Recommendations and perspectives working with heterogeneous data. *Environmental Sciences Europe* 38:77. <https://doi.org/10.1186/s12302-026-01361-4>

Gcakasi MN, Stumpp C, Watzinger A (2026) Establishment of a purge and trap continuous-flow isotope ratio mass spectrometer system for analysis of stable nitrate isotopes ( $\delta^{15}\text{N}$  and  $\delta^{18}\text{O}$ ) in water samples by Ti(III) reduction. *Rapid Communications in Mass Spectrometry* 40:e70054. <https://doi.org/10.1002/rcm.70054>

Gerritzen CT, Stamataki E, Goderis S, et al (2026) Strontium, fire, and bones:  $^{87}\text{Sr}/^{86}\text{Sr}$  and  $\delta^{88}/^{86}\text{Sr}$  values remain unaffected in bone heated up to 1400 °C. *Journal of Archaeological Science* 187:106488. <https://doi.org/10.1016/j.jas.2026.106488>

Giannioti Z, Pianezze S, Roncone A, et al (2025) Comparison of gas and liquid chromatography (GC, LC) coupled with isotope ratio mass spectrometry (IRMS): A case study on rice amino acids. *Journal of Chromatography A* 1763:466403. <https://doi.org/10.1016/j.chroma.2025.466403>

Hall O, Derian AAY, Rausch A, et al (2026) Documenting the extent of intra-bone isotopic variation. *Journal of Archaeological Science* 188:106521. <https://doi.org/10.1016/j.jas.2026.106521>

Jin L, Shi S, Wang X (2026) Progress in stable isotope analysis for natural fiber traceability. *Journal of Natural Fibers* 23:2615648. <https://doi.org/10.1080/15440478.2026.2615648>

Kawashima H, Iezumi T, Suto M, Taniyasu S (2026) Stable carbon isotope analysis of PFOA and PFOS using Orbitrap mass spectrometry. *Environmental Science & Technology Letters* 13:574–579. <https://doi.org/10.1021/acs.estlett.6c00075>

Loupias LL, Otero F, García Mancuso R, Valenzuela LO (2026) Defying dietary homogeneity: Stable isotopes in hair reveal persistent geographic heterogeneity in Argentina's modern diet. *American Journal of Human Biology* 38:e70223. <https://doi.org/10.1002/ajhb.70223>

Machado HG, Mueller EP, Ribeiro JCO, et al (2026) Lessons learned in Orbitrap MS-based isotope ratio analysis of organic acid mixtures. *Analytical Chemistry* 98:9764–9775. <https://doi.org/10.1021/acs.analchem.5c07111>



*This newsletter was compiled and edited by Lesley Chesson. It was created using a Microsoft® Word template.*

## Have Feedback? Contact Us

### FIRMS Network

[news@forensic-isotopes.org](mailto:news@forensic-isotopes.org)

[forensic-isotopes.org](http://forensic-isotopes.org)

Malinovsky D, Dunn PJH, Engin BA, Goenaga-Infante H (2026) Determination of absolute isotope ratios of vanadium by internal standardisation. *Journal of Analytical Atomic Spectrometry* 10.1039.D5JA00509D. <https://doi.org/10.1039/D5JA00509D>

Martinelli LA, Figueiredo Almeida R, Da Silva Araújo MG, et al (2026) Isotope fingerprinting for traceability in the Amazon bioeconomy: A Bayesian assignment approach with açai. *Trees, Forests and People* 24:101207. <https://doi.org/10.1016/j.tfp.2026.101207>

\*Moossen H, Steur PM, Camin F, et al (2026) How well do we know VPDB—Part 2: Interlaboratory assessment of existing  $\delta^{13}\text{C}_{\text{VPDB}}$  reference materials. *Rapid Communications in Mass Spectrometry* 40:e10171. <https://doi.org/10.1002/rcm.10171>

Niemann F, Kuhlbusch NJ, Gruhlke A, et al (2026) Toward molecular forensics of agrochemicals with Orbitrap IRMS: Isotopic fingerprints of Imidacloprid sources and elucidating hydrolysis. *Journal of the American Society for Mass Spectrometry* 37:1196–1206. <https://doi.org/10.1021/jasms.5c00444>

Nuralykyzy B, Wadood SA, Nie J, et al (2026) Guidelines for sample preparation and stable isotope analysis of food for traceability studies. *Food Safety and Health fsh3*.70072. <https://doi.org/10.1002/fsh3.70072>

Pawlowski R, Forbes SL, Szpak P (2026) Stable isotopes ( $\delta^{13}\text{C}$ ,  $\delta^{15}\text{N}$ ,  $\delta^{34}\text{S}$ ) of human skin during decomposition. *Forensic Science International* 382:112871. <https://doi.org/10.1016/j.forsciint.2026.112871>

Ramirez DA, Meermann B (2026) Toward diagnostically relevant isotope-ratio biomarkers: What does MC-ICP-MS still need for standardized measurements? *Analytical and Bioanalytical Chemistry* <https://doi.org/10.1007/s00216-026-06517-y>

Sena-Souza JP, Costa FJV, Kisaka TB, et al (2025) Spatial variation of stable hydrogen and oxygen isotopes in tap water in Brazil. *Science of The Total Environment* 991:179952. <https://doi.org/10.1016/j.scitotenv.2025.179952>

Souza-Silva IM, Martinelli LA, Holmes B, et al (2026) Machine-learning models of  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  isoscapes in Amazonian wood. *Biogeosciences* 23:881–904. <https://doi.org/10.5194/bg-23-881-2026>

Stantis C, Willmes M, Le Corre M, et al (2026) Global compilation of bioavailable strontium isotope data. *Scientific Data* 13:299. <https://doi.org/10.1038/s41597-026-06643-3>

Szpak P (2026) An automated spreadsheet for determining analytical uncertainty of stable isotope measurements. *Journal of Archaeological Science* 186:106457. <https://doi.org/10.1016/j.jas.2025.106457>

Welti N, Hawkins S, Waltenberg K, et al (2026) A common ontology for stable isotope data. *Applied Geochemistry* 198:106682. <https://doi.org/10.1016/j.apgeochem.2026.106682>

Yang X, Cheng H, Zhang Q, et al (2026) Application of stable isotopes in pollutant source attribution and liability determination: Under the framework of environmental forensics. *Process Safety and Environmental Protection* 211:108825. <https://doi.org/10.1016/j.psep.2026.108825>