



*The highlights of this newsletter are the continuation of the FIRMS PT scheme as well as the recent Science & Justice Special edition containing papers from the 5<sup>th</sup> FIRMS Conference held in 2013...*

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### Steering Group News

Since the last newsletter, Wolfram Meier-Augenstein has moved on from both the James Hutton Institute and his position as Director of the FIRMS Network. We take this opportunity to thank him for his invaluable contribution to the network over the years and hope that the future continues to bring him every success. Also, Tim Knowles has left Mass Spec Analytical to return to the University of Bristol as a researcher in Accelerator Mass Spectrometry - we wish him all the best for the future. Mass Spec Analytical are not renewing their institutional membership of FIRMS and we thank them for their input to FIRMS since its inception.

We welcome two new members to the Steering Group: Federica Camin and Rob Posey. Federica is the Head of the Stable Isotope and Traceability Platform at the Instituto Agario do San Michele all'Adige (IASMA) which performs various stable isotope analyses. She is also the scientific coordinator of the European Wine Isotope Databank. Rob is the Laboratory Manager of Food Forensics which is based in Norwich in the UK. Food

Forensics carries out a variety of isotope analyses on foods and beverages for traceability, origin and method of production investigations. Rob has also kindly volunteered to help collate the FIRMS newsletter.

The FIRMS Steering group currently consists of: Jim Carter (Chair & Director, Queensland Health Forensic and Scientific Services); Sean Doyle (Quality Manager, Director & Secretary, Linked Forensic Consultants Ltd); Phil Dunn (Membership Secretary & Newsletter Ed, LGC); Federica Camin (IASMA) Lesley Chesson (Iso-Forensics); Max Coleman (NASA Jet Propulsion Laboratory); Russell Frew (University of Otago); Kylie Jones (Australian Federal Police); Niamh Nic Dæid (University of Strathclyde); Gerard van der Peijl (Netherlands Forensic Institute); Rob Posey (Newsletter Ed, Food Forensics); Helen Salorous (National Measurement Institute, Australia); Sabine Schneiders (Bundeskriminalamt); Libby Stern (FBI); David Widory (University of Quebec in Montreal) and Wee Chaun Yeo (Health Sciences Authority, Singapore).



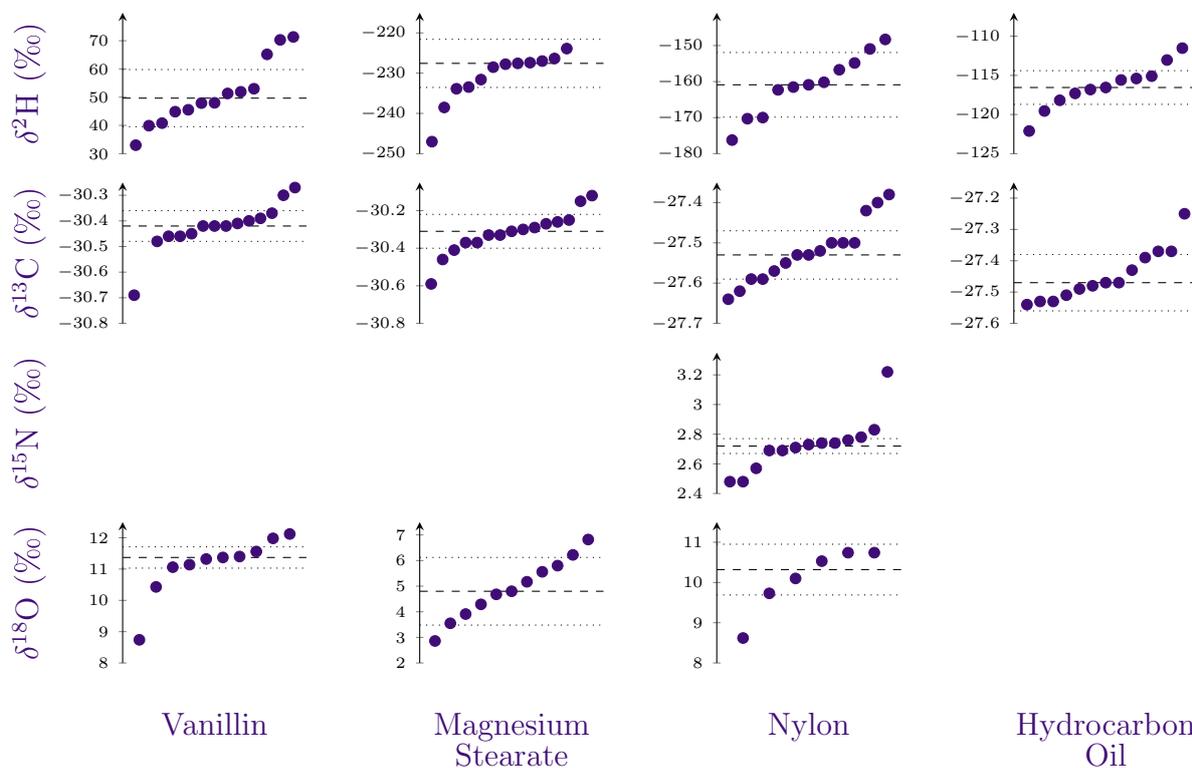
## Proficiency Testing Scheme

There have been two further rounds of the FIRMS PT scheme during 2014 - a summary of the results can be found below while a copy of the main report can be downloaded from [the FIRMS website](#). Compared with 2013 there was a small increase in the number of participants with a maximum of 16 reporting results for a given analyte, however it was a little disappointing that there were so few reported results for  $\delta^{18}\text{O}$  in Nylon. Carbon and nitrogen analyses continue to give good inter-laboratory results, while hydrogen and oxygen less so. For hydrogen, the presence of exchangeable H in the PT materials will no doubt contribute to the wide spread of results, due to the differences in how this is taken into account by participating laboratories.

LGC have applied to UKAS to add the FIRMS PT scheme to the scope of their accreditation to ISO/IEC 17043:2010. This process began in September 2014 and bar a few minor issues

that remain to be resolved, accreditation should follow in the near future.

For the 2015 rounds of the PT scheme, a fixed standard deviation for performance assessment (SDPA) of 0.15 ‰ will be used to calculate the z-scores for  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values (note that a satisfactory performance score is 2 x SDPA). This is based upon the results from previous rounds as well as expected inter-laboratory performance. This change should have little effect upon the C and N isotope results as the new values are similar to the spread from the previous rounds. For H and O, the PT scheme will continue to use the robust standard deviation arising from the reported results to calculate z-scores. This is because there isn't sufficient data available yet to fully justify assigned SDPA values for these elements. The PT scheme steering group will be revising this position following the completion of the two rounds scheduled for this year.



Results from FIRMS PT scheme in 2014. The lines represent the median of the results (dashed) plus or minus the robust standard deviation (dotted) following the exclusion of outliers.



## Approved Practitioners Scheme



In the last twelve months there have been no new applications for Approved Practitioner status. Un-

fortunately, two of our Approved Practitioners, Wolfram Meier-Augenstein and Helen Kemp have

decided to withdraw from the scheme for personal reasons. Individuals working in the field of isotope forensics who are interested in seeking approval should [contact FIRMS](#) via the usual e-mail address. Candidates for approval will be sent further details together with an initial assessment questionnaire.

## News in Brief For or From the FIRMS Community

The FIRMS Good Practice Guide is now several years old and the FIRMS Steering Group are currently considering updating the document. Any suggestions over what additions or revisions you'd like to see should be passed on to the SG via the special [BestPractice@forensic-isotopes.org](mailto:BestPractice@forensic-isotopes.org) e-mail address.

Thermo have released an updated version of their [GC-IsoLink](#) combustion interface for GC-C-IRMS analyses.

Isoprime have released a new model of IRMS the [VisION](#) - a smaller instrument with lower gas and electricity requirements.

Picarro have released the [A0217 Continuous Water Sampler](#), the first commercially-available device for real-time continuous analysis of  $\delta^{18}\text{O}$  and  $\delta^2\text{H}$  in liquid water.

[Nu Instruments](#) has unveiled their latest mass spectrometer: the Panorama. The instrument has been designed specifically to measure diagnostic ratios of the rare methane isotopologues  $^{12}\text{CH}_2\text{D}_2$  and  $^{13}\text{CH}_3\text{D}$  and is capable of unprecedented measurements of isotopic bond ordering in methane gas.

The [Elliott Review](#) into the integrity and assurance of food supply networks was published last year following increasing concern over the security of the UK food supply chain. The review calls for a zero tolerance policy on food fraud and will catalyse the formation of centres of excellence for food authenticity testing to include IRMS.

The [Global Stable Isotope Ratio Mass Spec-](#)

[trometer Industry Report 2014](#) has been published.

The IAEA have released two new sets of three reference waters each: one set of singly labelled waters, only enriched in  $^2\text{H}$  (IAEA 604-606), and another set of doubly labelled waters, enriched in both  $^2\text{H}$  and  $^{18}\text{O}$  (IAEA 607-609). They cover  $\delta^2\text{H}$  and  $\delta^{18}\text{O}$  values in the range of 80016000 ‰ and 1002000 ‰, respectively and should be available to order soon.

LGC are coordinating a forthcoming Key Comparison (KC) for the Inorganic Analysis Working Group (IAWG) of the Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM). The measurement will be carbon isotope ratios (delta values) in honey with potentially S isotope ratios also included. While this KC is only open to National Measurement Institutes (NMIs) and Designated Institutes (DIs), there is potential for the same material to be more widely distributed to other laboratories for a parallel inter-laboratory comparison exercise should there be sufficient interest. Note that this is separate from the PT scheme organised by LGC PT on behalf of FIRMS. For further information, please contact the KC co-ordinator [Phil Dunn](#).

Forthcoming conferences of interest to the FIRMS community include the [Advances in Stable Isotope Techniques and Applications \(ASITA\)](#) conference (27<sup>th</sup>-30<sup>th</sup> June 2015 in Ottawa, Canada), [Pittcon](#) (8<sup>th</sup>-12<sup>th</sup> March 2015 in New Orleans, USA), the [UK Archaeological Sciences Conference](#) (8<sup>th</sup>-11<sup>th</sup> April 2015 at Durham



University, UK), the EGU General Assembly (12<sup>th</sup>-17<sup>th</sup> April 2015 in Vienna, Austria), the IAEA International Symposium on Isotope Hydrology: Revisiting Foundations and Exploring Frontiers (11<sup>th</sup>-15<sup>th</sup> May 2015 in Vienna, Austria), Goldschmidt (16<sup>th</sup>-21<sup>st</sup> August 2015 in

### 6<sup>th</sup> FIRMS Network Conference

We extend a warm welcome to you all to Auckland, New Zealand, for the 6<sup>th</sup> FIRMS Network Conference to be held in conjunction with the 23<sup>rd</sup> Australian and New Zealand Forensic Sci-

ence Society (ANZFSS) International Symposium on the Forensic Sciences. The Symposium is to be held from Sunday 18<sup>th</sup> to Friday 23<sup>rd</sup> September 2016 at the SkyCity Convention Centre in the heart of downtown Auckland. You can already register your interest!

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## Recent Publications

### Books & Book Chapters

There have been no books or book chapters of interest to the FIRMS community published since the last newsletter that we are aware of.

### Journal Special Editions

There has been one journal special editions of interest to the FIRMS community since the publication of the last newsletter: the Science & Justice issue containing papers relating to the FIRMS Conference. This issue was guest-edited by Sean Doyle and Jim Carter and the papers from this special edition are highlighted within the recent publications below.

### Papers

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

Ai, G., Sun, T. and Dong, X., “Gas chromatography/isotope ratio mass spectrometry: Analysis of methanol, ethanol and acetic acid by direct injection of aqueous alcoholic and acetic acid samples,” *Rapid Commun. Mass Spectrom.* (2014), **28**:1–9

Ansmann, I.C., Lanyon, J.M., Seddon, J.M. and Parra, G.J., “Habitat and resource partitioning among indo-pacific bottlenose dolphins in moreton bay, australia,” *Marine Mammal Science* (2015), **31**:211–230

Barbieri, A.B., Sarkis, J.E.S., Martinelli, L.A., Bordon, I.C.A.C., Mitteregger, H. and Hortellani, M.A., “Forensic evaluation of metals (Cr, Cu, Pb, Zn), isotopes ( $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ ), and C:N ratios in freshwater sediment,” *Environ. Forensics* (2014), **15**:134–146

Bartelink, E.J., Berg, G.E., Beasley, M.M. and Chesson, L.A., “Appliocation of stable isotope forensics for predicting region of origin of human remains from past wars and conflicts,” *Annals of Anthropological Practice* (2014), **38**(1):124–136

Baumann, E.J. and Crowley, B.E., “Stable isotopes reveal ecological differences amongst now-extinct proboscideans from the cincinnati region, usa,” *Boreas* (2015), **44**(1):240–254

Bay, L.J., Chan, J.S.H. and Walczyk, T., “Isotope ratio analysis of carbon and nitrogen by elemental analyser continuous flow isotope ratio mass spectrometry (EA-CF-IRMS) without the use of a reference gas,” *J. Anal. At. Spec.* (2014), **30**:310–314

Beckett, N.M., Cresswell, S.L., Grice, D.I. and Carter, “Isotopic profiling of seized benzyloperazine and trifluoromethylphenylpiperazine tablets using  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  stable isotopes,” *Sci. & Just.* (2015a), **55**:51–56, **FIRMS Special Issue**

## Feature Article

The FIRMS Steering Group feel that the recent IUPAC Technical Report by Brand *et al.* (2014) merits special attention. In this paper, the authors have collated the isotope ratios of all internationally distributed primary and secondary reference materials with specified delta values for elements where delta scales have been adopted. This allows easy access to the suggested values and uncertainties for a range of reference materials in one location. Where materials have been calibrated more than once, all historical data is presented together with a recommended value for users to apply. Note that material certificates may be updated more frequently than this publication.



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