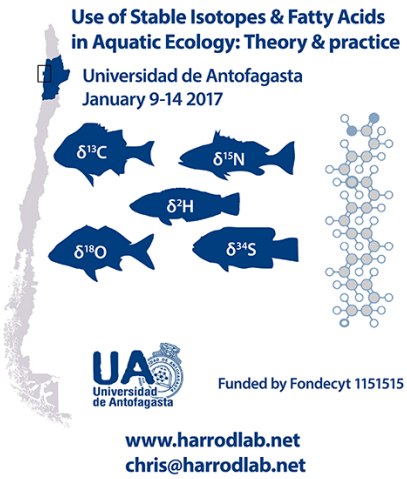
Use of Stable Isotopes & Fatty Acids in Aquatic Ecology: Theory & Practice. 9-14 January 2017



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Location: Instituto Antofagasta, Campus Coloso, Universidad de Antofagasta, Chile (Google Map here)

Dates: 9 – 14 January 2017

Coordinator: Dr. Chris Harrod, Titular Prof. in Fish & Aquatic Ecology, Instituto de Ciencias Naturales Alexander von Humboldt, Universidad de Antofagasta, Chile

Guest lecturer: Prof. Dr. Patrick Fink, Institut für Zellbiologie, Heinrich-Heine-Universität, Düsseldorf, Germany

Demonstrators: Felipe Docmac M.Sc. and Dr Claudio Quezada

Support: Course fees kindly funded by FONDECYT project 1151515 - Testing ecological orthodoxy: characterising the relative importance of pelagic and benthic-derived materials to coastal benthic food webs

Background: Biochemical techniques such as Stable isotope analysis (SIA) and Fatty Acid Analysis (FAA) are increasingly becoming standard tools in many branches of ecology, especially those examining aquatic taxa and ecosystems. These techniques are used to provide information at a range of levels of biological organisation from the organ, individual organisms, population, and species through to the ecosystem/landscape level. They are also used to inform our understanding of global biogeochemical cycles and environmental change. A good understanding of the potential (and limitations) of SIA and FAA is useful for biologists aiming to understand the literature and to develop their own research careers.

Course Description: The course (in English) is targeted at postgraduate students and early career researchers aiming to understand the theoretical background and the practical application of SIA and FAA in aquatic ecology (both marine and freshwater).

With a main focus on stable isotopes, the course will involve the students gaining an understanding of the theoretical background and practical application of SIA and FAA through the use of literature case studies and analysis of real datasets. Focusing on aquatic ecosystems and featuring hands-on data-analysis throughout, the course covers many different areas of ecology including: i) Fundamentals of stable isotope ratios and fatty

acids and their analysis; ii) Biogeochemical cycling; iii) Trophic ecology; iv) and isotopes as measures of ecosystem function and environmental change.

The course is divided into four parts: one involving lectures and discussions; a second involving computer-based practical data-analysis sessions; a third involving the students presenting a critical assessment of key stable isotope papers; and finally, a round-table mini-workshop where we examine and discuss isotope and fatty acid data or proposed studies provided by the delegates.

Learning outcomes: To provide an understanding of isotope ecology and the chemical, biochemical and biological foundations of variation in stable isotope ratios and fatty acids. To understand typical and potential applications of SIA and FAA in aquatic ecology. To become experienced in analysis of stable isotope anf fatty acid data. To develop statistical and presentation skills and to build professional networks.

Teaching approach: The course (in English) includes a mixture of case-study led lectures, computer-based practicals, discussion and a mini-project where students will present a summary and critically evaluation of a key stable isotope ecology paper (supplied). Practical sessions will involve the student undertaking worked examples of different analytical problems, with real-world datasets.

Evaluation: Students will be assessed on the results of each practical session (100 %).

Lunches: Lunches will be between 12:00 - 13:00

Activities: All activities will be held in the Instituto de Antofagasta, Campus Coloso, Universidad de Antofagasta

Timetable: Download PDF format (nb: subject to change)

Course materials: (password protected)

Applying for the course: Places on the course are limited, so preference will be for applicants currently using (or who will be using) stable isotopes and/or fatty acids in their research.

To apply, please send the following to chris@harrodlab.net:

1. A current academic CV (in English)

2. A letter of support from your academic supervisor

3. A one page letter of intention detailing why you want to attend the course and how it will help your research. Please include information on your area of research and how you wish to use (or how you have used) stable isotope analysis to fulfil your objectives. In your letter, please let us know if you have any particular dietary requirements for coffee breaks or lunch (e.g. food allergies) or health issues that we should be aware of

4. Please include contact details and a recent photo that we can use for the course materials.

Timetable

Date	AM Activity	PM Activity
Sunday 8 January	Travel to Antofagasta	17:00 Welcome and ice breaker (Instituto de Antofagasta)
Monday 9 January	9:00 Introduction to course & speakers. Introduction to Journal club –outline of mini-group project 9:30 Introduction to course delegates (short presentation of 5 minutes per person) 10:30 Lecture 1: Theory of stable isotope analysis	12:00 - 13:00 Lunch 13:00 - 18:00 Data practical 1: Preparation of stable isotope data for analysis Laboratory practical 1: Sample collection and preparation. Coffee break 15:30 - 16:00
Tuesday 10 January	9:00 Lecture 2: Biogeochemical and geographical drivers of isotopic variation 10:30 Lecture 3: Individual drivers of isotopic variation	12:00 - 13:00 Lunch 13:00 Data practical 2: Statistical analysis of isotopic variation between individuals and groups 15:30 - 16:00 Coffee break 16:00 - 18:00 Data Practical 3: Going from isotope data to ecological information 1 (estimating isotopic niche)
Wednesday 11 January	9:00 Lecture 4: Using stable isotopes to understand consumer diet and habitat use I 10:30 Lecture 5: Using stable isotopes to understand consumer diet and habitat use II	12:00 - 13:00 Lunch 13:00 Data Practical 4: Going from isotope data to ecological information 2 (estimating trophic position) 15:30 - 16:00 Coffee break 16:00 - 18:00 Data Practical 5: Simple isotope mixing models
Thursday 12 January	9:00 Lecture 6: Theory of fatty acid analysis 10:30 Lecture 7: Using fatty acids to understand consumer diet and habitat use	12:00 - 13:00 Lunch 13:00 Data Practical 6: Fatty acid data – handling and preparing for analysis 15:30 - 16:00 Coffee break 16:00 - 18:00 Data Practical 7: Multivariate analysis of fatty acid data

Date	AM Activity	PM Activity
Friday 13 January	9:00 Lecture 8: Putting it all together – tips (and pitfalls) for writing an isotope ecology paper 10:00 Journal Club: IsoGroup presentations – Groups present their critical reviews of key isotope ecology papers	12:00 - 13:00 Lunch 13:00 Data Practical 8: More complex isotope mixing models: MixSIAR 15:30 - 16:00 Coffee break 16:00 - 18:00 Data Practical 9: Combined analysis of isotope and fatty acid data
Saturday 14 January	9:00 Show us your data: interactive workshop on student isotope & fatty acid data	12:00 - 13:00 Lunch 13:00 Show us your data 2: interactive workshop on student isotope & fatty acid data 15:30 - 16:00 Coffee break 18:00 Course ends! 19:00 Asado (Chilean barbecue)
Sunday 15 January	Travel home	Travel home