

Hagit P. Affek – Curriculum Vitae (September 2021)

Institute of Earth Sciences

The Hebrew University of Jerusalem

Edmond J. Safra Campus

Phone: +972.2.6584654 | Fax +972.2.5662581 | email: hagit.affek@mail.huji.ac.il

PERSONAL DETAILS

Date of birth: October 23, 1971.

Country of birth: USA Immigration year: 1973 Citizenship: Israel, USA.

Military service: Compulsory service, intelligence corps, IDF. 1990 – 1991.

RESEARCH INTERESTS

Isotope geochemistry in studying global climate change:

Development and application of clumped isotopes and triple oxygen isotopes in carbonates, as proxies for paleotemperature and paleo-hydrology.

HIGHER EDUCATION

B.A in Chemistry, *Cum Laude*. Technion, Haifa, Israel. 1994.

M.Sc. in Chemistry. Weizmann Institute of Science, Rehovot, Israel. 1997.

Thesis: CO₂ Fluxes at the Saturated - Unsaturated Interface of a Phreatic Aquifer.

Adviser: Dan Yakir and Daniel Ronen.

Ph.D. in Environmental Sciences and Energy Research. Weizmann Institute of Science, Israel. 2003.

Thesis: Isoprene Emission from Plants: Physiological Role and Isotopic Composition.

Adviser: Dan Yakir.

Caltech, Pasadena, CA. 2003 – 2007.

Postdoc in Isotope geochemistry. Division of Geological and Planetary Sciences.

Host: John Eiler.

PROFESSIONAL APPOINTMENTS

Yale University, New Haven, CT 2007 – 2012.

Assistant Professor in the department of Geology and Geophysics.

Yale University, New Haven, CT 2012 – 2015.

Associate Professor in the department of Geology and Geophysics.

Hebrew University of Jerusalem, Israel 2015 – 2020.

Associate Professor in the Institute of Earth Sciences.

Hebrew University of Jerusalem, Israel 2020 – present.

Full Professor in the Institute of Earth Sciences

SERVICE AND OUTREACH

Yale University:

Director of postdoctoral affairs, 2011 - 2012.

Deputy director of the Earth Systems Center for Stable Isotopic Studies, 2010 – 2015.

University committees: Fulbright committee member, 2015.

Department committees: Program review and examination committee (2008, 2009). Flint fellow committee (2008, 2012). Colloquium committee (2009, 2012). Postdoctoral fellows committee (2009, 2011). Laboratory facilities and safety committee (2011, 2012).

Search committee member for a faculty position in Atmosphere, Ocean & Climate, 2009.

Doctoral committee member for 10 Yale students and 1 University of Texas student.

Panel member in academic job search panel for postdocs, 2008.

Hebrew University:

PhD defense judge for 2 students, and member of PhD/ MSc committee for 6 other students in the Institute of Earth Sciences at HUJI. PhD committee for 1 Weizmann Institute student, external examiner for 1 other PhD thesis in the Weizmann Institute and 1 MSc student in HUJI Faculty of Agriculture.

Institute of Earth Sciences seminar coordinator, 2016-2018.

Testify in front of appointments committee (2017, 2018).

Member of the university committee on appeals about adaptations for people with disabilities.

Member of the Institute of Earth Sciences search committee.

Scientific community and public outreach:

Organizer and host of the annual Clumped Isotopes Workshop, Jerusalem 2022.

Lecturer in the 1.5° project for climate change education outreach, 2021.

BSF panel member, 2019.

Scientific adviser to Maalot project for climate change education outreach, 2019.

Associate Editor for *Geochimica et Cosmochimica Acta*, 2014 – 2018.

Member of Science Committee for the Goldschmidt conference, 2018.

ISF panel member, 2017.

Biogeochemistry theme chair for the Goldschmidt conference, 2016.

Session chair in the AGU Fall Meeting, 2015.

NSF panel member, 2014.

Organizing committee member of the annual Clumped Isotopes Workshop, 2013, 2014, 2016.

Organizing a workshop ‘From Process to Proxy’ on paleotemperature proxies, ~70 participants, 2011.

Session chair in Goldschmidt meeting, 2009 and 2011.

Yale Alumni Magazine Forum article ‘What we know about the climate’ explaining the science behind climate change understanding. July/August 2010.

Panel member in ‘Why Science?’ discussion with New Haven public high school students, Peabody museum Pathways program, 2010.

Review of manuscripts and proposals for a variety of journals and funding agencies.

Membership: AGU, Geochemical Society.

HONORS AND AWARDS

- Dean's List of the faculty of chemistry in the Technion 1993, 1994
- Outstanding student paper award in the Conference of the Israel Society for Ecology and Environmental Quality Sciences 2000
- Outstanding student paper award at the AGU spring meeting 2002
- Early Career Scientist Award, Gordon Research Conference of Biogenic Hydrocarbons & the Atmosphere 2002
- Annual prize of the Israel Chemical Society 2003
- Kavli Fellow 2013

PAST AND CURRENT GRANTS

2009–2013: US National Science Foundation – Earth Sciences - NSF-EAR-0842482: Understanding the processes affecting clumped isotopes composition in speleothems and their implication to paleotemperature reconstruction. \$329,311.

2009–2013: United States - Israel Bi-national Science Foundation - BSF-2008158: Paleotemperatures and origin of rainfall in the Eastern Mediterranean region interpreted through the clumped isotopes and fluid inclusion D/H record of Israeli speleothems. With Alan Matthews and Avner Aylon. \$50,368 / \$152,000.

2011: Yale Climate and Energy Institute grant for convening a workshop: 'From Process to Proxy' discussing paleotemperature proxies. \$10,000.

2016–2020: Israel Science Foundation - 171/16: Carbonate clumped isotope thermometry in mollusk shells: calibration, vital effects, and implications for paleotemperature reconstruction. 1,234,680 NIS.

Israel Science Foundation - new faculty equipment grant - 1000/16: Isotope ratio mass spectrometer adapted for clumped isotopes analysis. 1,032,422 NIS.

2017-2022: ERC consolidator Grant 2016: Speleothems paleoclimate: accounting for isotopic disequilibrium (SPADE). 2,000,000 Euro.

2020: Israel Science Foundation – grant for a scientific workshop: Clumped isotope geochemistry – innovations, challenges and applications. 70,000 NIS.

GRADUATE STUDENTS AND POSTDOCTORAL ADVISEES.

Yale University:

PhD students:

2012 - 2019: Robin Dawson (sole adviser till 2015, co-adviser with Dr. Pincelli Hull since 2016). Currently a postdoc in the University of Massachusetts (USA).

2008 - 2014: Shikma Zaarur (sole adviser). Currently an Assistant Professor in the Faculty of Agriculture, HUJI (Israel).

2008 - 2014: Peter Douglas (co-adviser with Prof. Mark Pagani). Currently Assistant Professor, McGill University (Canada).

2009 - 2015: Yige Zhang (co-adviser with Prof. Mark Pagani). Currently Assistant Professor, Texas A&M University (USA).

Postdocs:

2009 Alessandro Zanazzi. Currently, Associate Professor, Utah Valley University (USA).

2010 - 2011: Tobias Kluge. Currently, Assistant Professor, Karlsruhe Institute of Technology (Germany).

2010 - 2011: Casey Saenger. Currently, Research Scientist, University of Washington (USA).

2015 - 2016: David Evans. Currently, Research Fellow, Goethe Universität, Frankfurt (Germany).

Hebrew University:

Current and past MSc student:

2016 - 2019: Shelly Bergel.

2020-present: Yael Tal.

2021-present: Ahinoam Assor.

Current and past postdocs:

2017 - 2019. Ny Riavo Voarintsoa.

2018- 2020. Rolf Vieten.

TEACHING

Yale University:

- *GG 702: Global climate change.* Graduate and undergraduates.
- *GG 740: Students' research seminar.* Graduate.
- *GG 308/508: The global carbon cycle.* Graduate and undergraduate.
- *GG 240: Forensic Geoscience.* Undergraduate.
- *SCIE 198: Perspectives on Science and Engineering.* Undergraduate.

Hebrew University:

- *82657 Atmospheric chemistry.* Undergraduate.
- *70691 BSc Student seminar in geology:* Undergraduate
- *82609 Undergraduate seminar in climate, atmospheric and oceanographic sciences.* Undergraduate.
- *70705 Stable isotope geochemistry.* Graduate.
- *70855 Advanced geochemistry seminar.* Graduate.
- *89309 Introduction to environmental sciences.* Undergraduate.

LIST OF PUBLICATIONS

Journal Articles:

1. **Affek H.P.**, Ronen D. and Yakir D. (1998) Production of CO₂ in the capillary fringe of a deep phreatic aquifer. Water Resources Research 34(5), 989-996.
2. **Affek H.P.** and Yakir D. (2002) Protection by isoprene against singlet oxygen in leaves. Plant Physiology 129(1), 269-277.
3. **Affek H.P.** and Yakir D. (2003) Natural abundance carbon isotope composition of isoprene reflects incomplete coupling between isoprene synthesis and photosynthetic carbon flow. Plant Physiology 131, 1727-1736.
4. **Affek H.P.**, Krisch M.J. and Yakir D. (2006) Effects of intra-leaf variations in carbonic anhydrase activity and gas exchange on leaf C¹⁸O isoflux in *Zea mays*. New Phytologist 169(2), 321-329.
5. **Affek H.P.** and Eiler J.M. (2006) Abundance of mass 47 CO₂ in urban air, car exhaust and human breath. Geochimica et Cosmochimica Acta 70, 1-12.
6. Ghosh P., Adkins J., **Affek H.P.**, Balta B., Guo W., Schauble E. A. and Eiler J.M. (2006) ¹³C-¹⁸O bonds in carbonate minerals: A new kind of paleothermometer. Geochimica et Cosmochimica Acta 70, 1439-1456.
7. **Affek H.P.**, Xu, X. and Eiler J.M. (2007) Seasonal and diurnal variations of ¹³C¹⁸O¹⁶O in air: Initial observations from Pasadena, CA. Geochimica et Cosmochimica Acta 71. 5033-5043.
8. **Affek H.P.**, Bar-Matthews M., Ayalon A., Matthews A., and Eiler J.M. (2008) Glacial/interglacial temperature variations in Soreq cave speleothems as recorded by 'clumped isotope' thermometry. Geochimica et Cosmochimica Acta 72. 5351-5360.
9. Newman S., Xu X., **Affek H.P.**, Stolper E., Epstein S. (2008) Changes in mixing ratio and isotopic composition of CO₂ in urban air in the Los Angeles basin, California, between 1972 and 2003. Journal of Geophysical Research - Atmospheres. 113. D23304.
10. Huntington K., Eiler J., **Affek H.P.**, Guo W., Bonafacie M., Yeung L.Y., Thiagarajan N., Passey B., Tripathi A., Daëron M., Came R. (2009) Methods and limitations of 'clumped' CO₂ isotope (Δ₄₇) analysis by gas source isotope ratio mass spectrometry. Journal of Mass Spectrometry 44. 1318-1329.
11. Yeung L.Y.*, **Affek H.P.***, Hoag K.J., Guo W., Wiegel A.A., Atlas E.L., Schauffler S.M., Okumura M., Boering K.A. and Eiler J.M. (2009) Large and unexpected enrichment in stratospheric ¹⁶O¹³C¹⁸O and its meridional variations. PNAS 106 (28). 11496-11501 (*equal contribution by Yeung and Affek).
12. Keating-Bitonti C., Ivany L., **Affek H.**, Douglas P., Samson S. (2011) Warm, not super-hot, temperatures in the Early Eocene subtropics. Geology 39 (8). 771-774.
13. Zaarur S., Olack G.A., **Affek H.P.** (2011) Paleo-environmental implications of clumped isotopes in land

snails shells. Geochimica et Cosmochimica Acta 75. 6859-6869.

14. Dennis K.J., **Affek H.P.**, Passey B.H., Schrag D.P., Eiler J.M. (2011) Defining an absolute reference frame for 'clumped' isotope studies of CO₂. Geochimica et Cosmochimica Acta. 75. 7117-7131. [4.258; 10/84 geochemistry and geophysics; 303].
15. Brand U., Posenato R., Came R., **Affek H.**, Angiolini L., Azmy K., Farabegoli E. (2012) The end Permian mass extinction: a volcanic CO₂ and CH₄ – climatic catastrophe. Chemical Geology. 322-3. 121-144.
16. Kluge T., **Affek H.P.** (2012) Quantifying kinetic fractionation in Bunker cave speleothems using Δ_{47} . Quaternary Science Reviews. 49. 82-94.
17. Saenger C., **Affek H.P.**, Felis T., Thiagarajan N., Lough J.M., Holcomb M. (2012) Carbonate clumped isotope variability in shallow water corals: Temperature dependence and growth-related vital effects. Geochimica et Cosmochimica Acta. 99. 224-242.
18. Kluge T., **Affek H.P.**, Marx T., Aeschbach-Hertig W., Riechelmann D.F.C., Scholz D., Riechelmann S., Immenhauser A., Richter D.K., Fohlmeister J., Wackerbarth A., Mangini A., Spötl C. (2013) Reconstruction of drip-water $\delta^{18}\text{O}$ based on calcite oxygen and clumped isotopes of kinetic speleothems from Bunker Cave (Germany). Climate of the Past. 9. 377-391.
19. **Affek H.P.** (2013) Clumped isotopic equilibrium and the rate of isotope exchange between CO₂ and water. American Journal of Science. 313. 309-325.
20. Zaarur S., **Affek H.P.**, Brandon M.T. (2013) A revised calibration of carbonate clumped isotopes thermometer. Earth and Planetary Science Letters. 382. 47-57.
21. Kluge, T., **Affek, H.P.**, Zhang, Y.G., Dublyanski, Y., Spötl, C., Immenhauser, A., Richter, D.A. (2014) Clumped isotope thermometry of cryogenic cave carbonates. Geochimica et Cosmochimica Acta. 126, 541-554.
22. Came R.E., Brand U., **Affek H.P.** (2014) Calibration of the carbonate clumped isotope paleothermometer using modern brachiopods. Chemical Geology. 377. 20-30.
23. Douglas P., **Affek H.P.**, Ivany L., Houben A.J.P., Sijp W., Sluijs A., Scouten S., Pagani M., (2014) Pronounced zonal heterogeneity in Eocene southern high latitude sea surface temperatures. PNAS. 111(18). 6582-6587.
24. Kluge T., **Affek H.P.**, Spötl C., Dubliansky Y. (2014) Devils Hole paleotemperatures and implications for oxygen isotope equilibrium fractionation. Earth and Planetary Science Letters. 400. 251-260.
25. **Affek H.P.**, Zaarur S. (2014) Kinetic isotope effect in CO₂ degassing: insight from clumped and oxygen isotopes in laboratory precipitation experiments Geochimica et Cosmochimica Acta. 143. 319-330.
26. **Affek H.P.**, Matthews A., Ayalon A., Bar-Matthews M., Bursteyn Y., Zaarur S., Zilberman T. (2014) Accounting for kinetic isotope effects in Soreq Cave (Israel) speleothems. Geochimica et Cosmochimica Acta. 143. 303-318.

27. Brand U., Came R, **Affek H.**, Azmy K., Mooi, R., Layton K. (2014) Climate-forced change in Hudson Bay composition and temperature, Arctic Canada. Chemical Geology. 388. 78-86.
28. Zaarur S., **Affek H.P.**, Stein M. (2016) Last glacial - Holocene temperature and hydrology of the Sea of Galilee and Hula Valley from clumped isotopes in *Melanopsis* shells. Geochimica et Cosmochimica Acta. 179. 142-155.
29. Siman-Tov S., **Affek H.P.**, Matthews A., Aharonov E., Reches Z. (2016) Shear heating and clumped isotope reordering in carbonate faults. Earth and Planetary Science Letters. 400. 251-260.
30. Daëron M., Balmart D., Peral M., **Affek H.P.** (2016) Absolute isotopic abundance ratios and the accuracy of Δ_{47} measurements. Chemical Geology. 442. 83-96.
31. Evans D., Sagoo N., Renema W., Cotton L.J., Muller W., Todd J.A., Saeaswati P.K., Stassen P., Ziegler M., Pearson P.N., Valdes P.J., **Affek H.P.** (2018) Eocene greenhouse climate revealed by coupled clumped isotope-Mg/Ca thermometry. PNAS. 115. 1174-1179.
32. **Affek H.P.**, Barkan E. (2018) A new method for high-precision measurements of $^{17}\text{O}/^{16}\text{O}$ ratios in H_2O . Rapid Communications in Mass Spectrometry. 32. 2096-2097.
33. Barkan E., **Affek H.P.**, Luz B., Bergel S.J., Voarintsoa, N.R.G. (2019) Calibration of $\delta^{17}\text{O}$ and $^{17}\text{O}_{\text{excess}}$ values of three international standards: IAEA-603, NBS19 and NBS18. Rapid Communications in Mass Spectrometry. 33. 737-740.
34. Dawson R.R., Field D.J., Hull P.M., Zelenitsky D.K., Therrien F., **Affek H.P.** (2020) Eggshell geochemistry reveals ancestral metabolic thermal regulation in Dinosauria. Science Advances. 6. eaax9361.
35. Bergel S.J., Barkan E., Stein M., **Affek H.P.** (2020) Constraining the relationship between the three oxygen isotope composition of carbonate mollusk shells and parent water. Geochimica et Cosmochimica Acta. 275. 36-47.
36. Voarintsoa N.R.G., Barkan E., **Affek H.P.** (2020) Experimental calibration of the three oxygen isotope fractionation between CaCO_3 and H_2O . Chemical Geology. 539. Article number 119500.
37. Bernasconi S.M., Daeron M. , Bergmann K.D. , Bonifacie M. , Meckler A.N. , **Affek H.P.** et al., (2021) InterCarb: A Community Effort to Improve Interlaboratory Standardization of the Carbonate Clumped Isotope Thermometer Using Carbonate Standards. Geochemistry, Geophysics, Geosystems. 22, e2020GC009588.

Book Chapters:

38. **Affek, H.P.** (2012) Clumped isotope paleothermometry: Principles, applications, and challenges. *in* Linda C. Ivany and Brian Huber (eds.), *Reconstructing Earth's Deep-Time Climate – The State of the Art in 2012*. Paleontological Society Papers, v. 18. 101-114. Invited review article.
39. **Affek H.P.**, Yakir D. (2014) The stable isotopic composition of atmospheric CO_2 . *In* Holland H.D. and Turekian K.K. (eds.) *Treatise on Geochemistry, Second Edition*, vol. 5pp. 179-212. Oxford: Elsevier. Invited review article.

Popular Science:

Affek H.P. (2010) What we know about the climate. *Yale Alumni Magazine, Forum article*. July/August 2010. 28-29. Invited opinion article.

Invited Conference / Workshop Talks (Last 10 Years)

Goldschmidt conference (June, 2012)

Short course on Paleoclimate Proxies at the 2012 GSA Meeting (November, 2012)

Clumped isotopes workshop, Harvard University (January, 2013)

Goldschmidt conference, keynote talk (June, 2014)

IsoCamp: Summer school on Stable Isotope Biogeochemistry & Ecology (June, 2014)

ISOTOPES 2015 conference (June, 2015)

Goldschmidt conference, keynote talk (August, 2019)

SINA meeting: Stable Isotope Network Austria, keynote talk (November, 2019)