

## CURRICULUM VITAE

### DR. TINA LÜDECKE

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### SHORT BIO AND RESEARCH INTERESTS

My main research interests lie in the reconstruction of Neogene paleolandscapes occupied by early hominins, and their adaptation to these ecosystems. I focus on C<sub>4</sub>-grassland expansion as a result of changing ecosystem patterns such as seasonality, precipitation, temperature, atmospheric CO<sub>2</sub>-concentration and (the retreat of) tree-cover. To do this I rely on extensive fieldwork and geochemical approaches including stable isotopes of carbon, oxygen and nitrogen, as well as clumped isotopes and multi-element analysis in a variety of proxy materials such as pedogenic carbonates and fossil tooth enamel. While I am involved in projects at Sangiran (Indonesia), the Levant (Syria) and the Central Anatolian Plateau (Turkey), my focus lies on the wooded savannas of south-eastern Africa (Tanzania, Malawi, Mozambique and South Africa). My goal is to understand the processes that link early hominin (dietary) adaptations to changes in the ecosystem they thrived in. Complementing the reconstruction of plant-based diet of hominins, I developed a new biogeochemical method to analyze nitrogen isotopes on fossil tooth enamel, allowing first insight in meat consumption of our early ancestors and hence their position in the paleo food-web.

### PROFESSIONAL EXPERIENCE

- 2019 – Present            Research Associate at the Institute of Climate Geochemistry, **Max-Planck Institute for Chemistry**, Mainz, Germany
- 2017 – Present            Post-Doctoral Researcher (DFG-funded), **Senckenberg Biodiversity and Climate Research Centre (SBiK-F)**, Frankfurt, Germany. Group Paleoclimate and Paleoenvironmental Dynamics  
  
DFG-ICDP-Project personal grant (LU 2199/1 and /1-2): ***Early Hominin Adaptation in the Southern East African Rift – Plio-Pleistocene African temperature, ecosystem and early hominin diet patterns across a woodland-grassland savanna boundary***
- 2017 – Present            Research Associate at the School of Anthropology and Museum Ethnography, **University of Oxford**, England
- 2016 – Present            Geochemist of the **Paleo-Primate-Project Gorongosa**, responsible for the reconstruction of Miocene paleoenvironments of the southernmost part of the East African Rift (Gorongosa National Park, Mozambique).
- 2016 – 2017                Post-Doctoral Researcher, Biomaterials and Biomimetics, College of Dentistry, **New York University**, New York City, NY, USA, method-development of simultaneous measurement of absolute concentrations of 71 elements in the periodic table (Li to U) via ICP-MS
- 2011 – 2016                PhD candidate, **Senckenberg Biodiversity and Climate Research Centre**, Frankfurt, Germany. *Stable isotope-based reconstruction of Neogene terrestrial archives*. Magna cum laude (very good)

## EDUCATION

### PhD

University **Johann Wolfgang Goethe University Frankfurt**, Germany, in cooperation with SBiK-F

Title ***Stable isotope-based reconstruction of Neogene terrestrial archives***

Defense 4<sup>th</sup> May 2016, Dr. rer. nat., Magna cum laude

Visiting PhD School of Earth, Energy & Environmental Science, **Stanford University**, CA, USA, duration: 2 month (October & November 2014)

Summer School **Darwin Summer School on Biogeosciences** “Perturbation of the global carbon cycle” in Utrecht and Texel, Netherlands, with the visit to NIOZ, duration: 2 weeks (July 2011)

### Diploma (Msc)

University **Gottfried-Wilhelm-Leibniz-University-Hannover, Germany**

Title **Late Cenozoic Paleoenvironmental signatures of the Central Anatolian Plateau** – Stable isotope geochemistry and Sedimentology of Lacustrine Sediments and Carbonate Paleosols

Duration March 2010 – November 2010, Dipl.-Geowiss., grade 1.0 (very good)

## AWARDED GRANTS

2019 DFG – ICDP Priority Programme, personal grant including “Eigene Stelle”, 98.000 € **(PI)**

2018 National Geographic Explorer Grants, (PI) 18.000 US\$

2017 DFG – ICDP Priority Programme, personal grant including “Eigene Stelle”, 208.000 € **(PI)**

2011 Hermann-Willkomm-Stiftung, travel grant, 400 €

2011 Hermann-Willkomm-Stiftung, travel grant, 900 €

## ACADEMIC ACTIVITIES

### TEACHING

2019 & 2020 Masters course at the Goethe University: “***Paleoenvironmental reconstructions in continental settings***”

2018 & 2019 **Oxford-Gorongosa Paleo-Primate Field School 2018 & 2019**

### REVIEWER FOR SCIENTIFIC JOURNALS

Since 2016 Journal of Human Evolution, Nature Ecology and Evolution, Paleogeography, Palaeoclimatology, Paleoecology

## LABORATORY EXPERIENCE

- IR-MS**  
(Thermo 253) Semi-automated acid bath and GC: **clumped isotope analysis** of pedogenic carbonates to reconstruct paleosol temperatures
- GasBench II:  **$\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  analysis** of fossil tooth enamel and pedogenic carbonates
- (Thermo 253 Plus) Biogeochemical denitrifier method:  **$\delta^{15}\text{N}$  analysis** of fossil tooth enamel
- si-ICP-MS**  
(Spektro MS) Analysis of **71 elements from Li to U** in liquids (environmental water, beverage samples, biofluids)
- LWIA**  
(LGR DLT-100)  **$\delta^{18}\text{O}$  and  $\delta\text{D}$  analysis** of modern meteoric waters

## FIELDWORK EXPERIENCE

- 2019, 2018, 2017, 2016 Mazamba Formation, Gorongosa National Park, **Mozambique**, 4 months
- 2018 Manyara Beds, Manyara Basin, **Tanzania** (PI), 1.5 months
- 2016 Sangiran Formation, Java, **Indonesia**, 1 week
- 2013, 2012, 2011 Chiwondo Beds, Karonga Basin, **Malawi** (PI), 4 months
- 2012 North American Cordillera, Montana and Idaho, **USA**, 3 weeks
- 2011, 2010, 2008 Central Anatolian Plateau, **Turkey**, 2.5 month

## INVITED PRESENTATIONS

- 2020 Primate Models for Behavioural lab, **Oxford University**, England
- 2018 Department of Anthropology, **University of Chile**, Santiago, Chile
- 2017 Lamont-Doherty Earth Observatory, **Columbia University**, NY, USA
- 2016 Department of Archaeology, **Eberhard Karls University**, Tübingen, Germany

## LANGUAGES

English full professional proficiency, German native

## MEDIA EXPOSURE

- 2019 Research highlight "Hominins had flexible diets" by **Nature Human Behavior**: <https://www.nature.com/articles/s41562-018-0524-z?fbclid>
- Public lecture "Zähne der Zeit". Posted on you tube (German only): [https://www.youtube.com/watch?v=uKp0iBQ\\_u7I](https://www.youtube.com/watch?v=uKp0iBQ_u7I)
- 2018 Several newspaper articles reporting Lüdecke et al., 2018 (PNAS). Press release: [http://www.senckenberg.de/root/index.php?page\\_id=5210&PHPSESSID=q14u0chfgjq9avme2hr214m933&kid=2&id=4969](http://www.senckenberg.de/root/index.php?page_id=5210&PHPSESSID=q14u0chfgjq9avme2hr214m933&kid=2&id=4969)
- 2017 Presentation posted on *YouTube* and *vimeo* about the Paleo-Primate-Project Gorongosa: <https://www.youtube.com/watch?v=hR5GKbrsuS0&feature=youtu.be>
- 2015 Several newspaper articles reporting Lüdecke et al., 2016 (JHE). Press release: [http://www.senckenberg.de/root/index.php?page\\_id=5206&kid=2&id=3852](http://www.senckenberg.de/root/index.php?page_id=5206&kid=2&id=3852)
- 2011 Newspaper article in the *Sächsische Zeitung*: 'Die Gärtner vom Stammbaum'. Nov. 12, 2011

## LIST OF PUBLICATIONS

### PEER-REVIEWED

- Martinez, F.I., Capelli, C., Ferreira da Silva, M.J., Aldeias, V., Alemseged, Z., Archer, W., Bamford, M., Biro, D., Bobe, R., Braun, D., Habermann, J.M., **Lüdecke, T.**, Madiquida, H., Mathe, J., Negash, E., Paulo, L.M., Pinto, M., Stalmans, M., Tatá, F., Carvalho, S. A. (2019). A missing piece of the Papio puzzle: Gorongosa baboon phenostructure and intrageneric relationships. *Journal of Human Evolution*, 130, 1-20.
- Ernst, M., Thiemeyer, H., **Lüdecke, T.** (2019). Stable isotope signatures of radiocarbon dated pedogenic carbonate from Tell Chuera (NE Syria) reveal fluctuating paleoenvironmental patterns in the Pleistocene Levant. *Zeitschrift für Geomorphologie*, 62, Suppl. 1, 059-084.
- Lüdecke, T.**, Kullmer, O., Wacker, U., Sandrock, O., Fiebig, J., Schrenk, F., Mulch, A. Dietary Versatility of Early Pleistocene Hominins. *Proceedings of the National Academy of Sciences*, 115, 723-738.
- Habermann, J.M., Alberti, M., Aldeias, V., Alemseged, Z., Archer, W., Bamford, M., Biro, D., Bobe, R., Braun, D.R., Capelli, C., Cunha, E., Ferreira, M.J., **Lüdecke, T.**, Madiquida, H., Martinez, F., Negash, E., Paulo, L.M., Pinto, M., Stalmans, M., Tatá, F., Wynn, J., Carvalho, S. (2018). Neogene coastal-plain estuarine record in the Gorongosa area, central Mozambique: paleoenvironment and paleoecological implications for the ancient East African margin and its use in primate land use potential. *In press* at *Paleogeography, Palaeoclimatology, Palaeoecology*, PALAEO3\_2018\_385.
- Ernst, M., Thiemeyer, H., **Lüdecke, T.** Stable isotope signatures of radiocarbon dated pedogenic carbonate from Tell Chuera (NE Syria) reveal fluctuating paleoenvironmental patterns in the Pleistocene Levant. **Accepted** at *Zeitschrift für Geomorphologie*, MS#553.
- Meijers, M.J.M., Brocard, G.Y., Cosca, M.A., **Lüdecke, T.**, Teyssier, C., Whitney, D.L., Mulch, A. (2018). Rapid Late Miocene Surface Uplift of the Central Anatolian Plateau Margin. *Earth and Planetary Science Letters*, 497, 29-41.
- Lüdecke, T.**, Mulch, A., Kullmer, O., Sandrock, O., Thiemeyer, Fiebig, J., Schrenk, F. (2016). Stable isotope dietary reconstructions of herbivore enamel reveal heterogeneous savanna ecosystems in the Plio-Pleistocene Malawi Rift. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 459, 170–181.
- Lüdecke, T.**, Schrenk, F., Thiemeyer, H., Kullmer, O., Bromage, T.G., Sandrock, O., Fiebig, J., Mulch, A. (2016). Persistent C<sub>3</sub> vegetation accompanied Plio-Pleistocene hominin evolution in the Malawi Rift (Chiwondo Beds, Karonga Basin, East African Rift System). *Journal of Human Evolution*, 90, 163-175.
- Fiebig, J., Hofmann, S., Löffler, N., **Lüdecke, T.**, Methner, K., Wacker, U. (2015). Slight pressure imbalances can affect accuracy and precision of dual inlet-based clumped isotope analysis. *Isotopes in Environmental and Health Studies*, 52, 12-28.
- Lüdecke, T.**, Thiemeyer, H. (2013). Palaeoenvironmental Characteristics of the Plio-Pleistocene Chiwondo and Chitimwe Beds (N-Malawi). In: Runge, J. *Palaeoecology of Africa Vol. 32: An International Yearbook of Landscape Evolution and Palaeoenvironments*, 143-161.
- Lüdecke, T.**, Mikes, T., Rojay, B., Cosca, M.A., Mulch, A., (2013). Stable isotope-based reconstruction of Oligo-Miocene paleoenvironment and paleohydrology of Central Anatolian lake basins (Turkey). *Turkish Journal of Earth Sciences*, 22, 793-819.

## OTHER

**Lüdecke, T.**, (2017). Wald oder Savanne? Neue Erkenntnisse aus den Fundstätten in Südostafrika geben Auskunft darüber, wie anpassungsfähig unsere Vorfahren waren. Das Senckenbergwissenschaftsmagazin 147, Heft 03/04 2017, 86-93.

**Lüdecke T.** (2016). Stable isotope-based paleoenvironmental reconstruction of Neogene terrestrial archives. *Doctoral Thesis, Goethe University Frankfurt*. urn:nbn:de:hebis:30:3-403557.

## FIRST AUTHOR CONTRIBUTIONS AT INTERNATIONAL CONFERENCES

- 2019     \***East African Association of Paleoanthropology and Paleontology (EAAPP)**, Ethiopia Nairobi, Kenya  
          \***European Society for the Study of Human Evolution (ESHE)**, Liège, Belgium
- 2018     \*\***European Society for the Study of Human Evolution (ESHE)**, Faro, Portugal
- 2017     \***East African Association of Paleoanthropology and Paleontology (EAAPP)**, Addis Ababa, Ethiopia  
          \***AnalytiX-2017**, BIT's 5<sup>th</sup> Annual Congress of AnalytiX, Fukuoka, Japan
- 2016     \***100+25 years of Homo erectus: Dmanisi and beyond**, International Senckenberg Conference, Tbilisi, Georgia  
          \***International Geological Congress (IGC)**; Cape Town, South Africa, Abstract# 2047
- 2015     \***Geological Society of America (GSA)**, Annual Meeting, Baltimore, MA, USA, Abstract# 102-8  
          \***The Role of Culture in Early Expansions of Humans (ROCEEH)**, Expansions 2015, Frankfurt, Germany
- 2014     \***Geological Society of America (GSA)**, Annual Meeting, Vancouver, Canada, Abstract# 292-0  
          \***European Geophysical Union (EGU)**, Annual Assembly, Vienna, Austria, Abstract# EGU2014-12168  
          \***DGG "Geo-Frankfurt"**, Frankfurt, Germany, Abstract: SDGG 85, page 252
- 2013     \***American Geophysical Union (AGU)**, Fall Meeting, San Francisco, CA, USA, Abstract# PP24A-02  
          \***European Geophysical Union (EGU)**, Annual Assembly, Vienna, Austria, Abstract# EGU2013-4616
- 2011     \*\***DGG-GV "Fragile Earth"**, Munich, Germany, Abstract# 41-6. *Winner of student poster award*

\*talk, \*\*poster

Frankfurt, December 2019