

**Daniel F. McGinnis, Ph.D.**  
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Married to Sabine Flury McGinnis

Born in Portsmouth, Virginia, USA September 6, 1971. Doctorate research at Virginia Tech involved measuring and modeling physical mixing processes in lakes and oceans, nutrient transport, bubble and plume modeling, and gas transfer.

#### **Research Interests and Activities**

- Benthic boundary layer hydrodynamics
- Bubble and plume modeling
- Climate effects on lakes and oceans
- Eddy-correlation in aquatic fluxes
- Greenhouse gas transport and emissions from waterbodies
- Transport at the sediment-water interface
- Turbulence under ice

#### **Education**

Ph.D. in Civil Engineering, Virginia Tech, December 2003  
M.S. in Environmental Engineering, Virginia Tech, May 2000  
B.S. in Civil Engineering, *Magna Cum Laude*, Virginia Tech, June 1996

#### **Experience**

2008 – Present: Research Scientist, IFM–GEOMAR, Marine Biogeochemistry, Germany  
2003 – 2008: Post-doctorate, Surface Waters – Research and Management, Eawag, Switzerland  
2000 – 2003: Guest Researcher, Eawag, Switzerland  
1995 – 2000: Graduate Research Assistant, Virginia Tech, Blacksburg, VA

#### **Supervised and Co-supervised Masters and Ph.D. Students**

2010 – present: Karl Attard, University of Southern Denmark  
2010 – present: Andreas Mäck, University of Landau, Germany  
2008 – present: Lorenzo Rovelli, IFM-GEOMAR, Marine Biogeochemistry, Germany  
2007 – present: Tonya DeISontro, Eawag, Surface Waters, Switzerland  
2006 – 2010: Claudia Lorrai, Eawag, Surface Waters, Switzerland  
2006 – 2010: Lee Bryant PhD, Virginia Tech, Dept. of Civil and Environmental Engr.  
2007 – 2008: Liu Hui MSc, IHE Delft, The Netherlands  
2006 – 2007: Theresa J. Edmonds (Practicum)  
2005 – 2008: Vickie Singleton PhD, Virginia Tech, Dept. of Civil and Environmental Engr.  
2002 – 2003: Stewart Gwaze MSc, IHE Delft, The Netherlands  
2001 – 2002: Serghei Bocaniov MSc, IHE Delft, The Netherlands

#### **Funded Research Projects and Grants**

- Methane Emissions from Impounded Rivers: A process-based study at River Saar (Deutsche Forschungsgemeinschaft (DFG), 2010 – 2013)\*

- Fluid- and gas emanations offshore Saudi Arabia (Red Sea) – a window to subseafloor hydrocarbon formation/degradation processes (Germany, 2010 – 2013)\*
  - Eddy correlation: heat flux application (Future Ocean Germany, 2010 – 2011)\*
  - Methane and benthic fluxes in the North Sea (SDNS Germany, 2008 – 2010)
  - Turbulence and fluxes in stratified natural waters (NF Switzerland, 2003 – 2008)\*
  - The role of lake sediments in the carbon cycle (NF Switzerland, 2006 – 2008)\*
  - New Vents: New Zealand Cold Vents (IFM-GEOMAR Germany, 2007 – 2008)
  - CRIMEA: Contribution of high-intensity gas seeps in the Black Sea to methane emission to the atmosphere (EU, 2003 – 2006)\*
  - Hypolimnetic oxygenation: Plume and reservoir models (NSF USA, 2000 – 2003)
  - Nutrient retention capacity of the Iron Gate Reservoir, Romania (SCOPE5, 2001 – 2002)
- (\* Denotes co-authored proposals)

### Scientific Cruises and Expeditions

- *RV Alkor*, Baltic Sea, June 10 – June 21, 2010.  
Duties: Eddy correlation measurements.
- *Kobbefjord Expedition*, Nuuk, Greenland, March 8 – March 19, 2010.  
Duties: Under-ice physical measurements, microstructure, ADCP.
- *RV Celtic Explorer*, North Sea, July 20 – Aug 14, 2009.  
Duties: CTD station leader, Eddy correlation landers, ADCP.
- *RV Alkor*, North Sea, October 8 – October 30, 2008.  
Duties: CTD station leader, water sampling, shipboard ADCP.
- *RV Sonne*, South Pacific, New Zealand, January 31 – February 25, 2007.  
Duties: CTD station leader, methane sampling, moorings, shipboard ADCP.
- *RV Professor Vodyanitskiy*, Black Sea, Ukraine, August 16 – 22, 2005.  
Duties: CTD station leader, temperature microstructure.
- *RV Professor Vodyanitskiy*, Black Sea, Istanbul, May 25 – June 8, 2004.  
Duties: Eawag expedition leader, moorings, temperature microstructure, in-situ pump sampling, sediment coring.
- *RV Istros*, Danube River, Bazias to Orsova, Romania, October 14 – 19, 2001.  
Duties: ADCP measurements

### Professional Organizations

- American Association for the Advancement of Science
- American Geophysical Union
- American Society of Civil Engineers
- European Geophysical Union
- New York Academy of Sciences
- Phi Kappa Phi

### Publications

- McGinnis, D. F., M. Schmidt, T. S. DelSontro, S. Themann, L. Rovell, A. Reitz, P. Linke (2010), Discovery of a natural CO<sub>2</sub> seep in the German North Sea: Implications for shallow dissolved gas and seep detection, *Accepted*.
- Bryant, L., D. F. McGinnis, C. Lorrai, A. Brand, J. C. Little, and A. Wüest (2010), Evaluating oxygen uptake rates from both sides of the sediment-water interface: a method study, *Limnol. Oceanogr.: Methods*, *In Press*.

- Bryant, L., C. Lorrai, D.F. McGinnis, A. Brand, A. Wüest, and J.C. Little (2010), Variable sediment oxygen uptake in response to dynamic forcing, *Limnology and Oceanography*, 55, 950-964.
- Del Sontro, T.S., D.F. McGinnis, S. Sobek, I. Ostrovsky, and B. Wehrli (2010), Extreme Methane Emission from a Swiss Hydropower Reservoir: Contribution from Bubbling Sediments, *Environmental Science & Technology*, 44 (7), 2419 – 2425.
- Linke, P., S. Sommer, L. Rovelli, and D.F. McGinnis (2010), Physical limitations of dissolved methane fluxes: The role of bottom-boundary layer processes, *Marine Geology*, 272 (1-4 Sp. Iss.), 209-222.
- Lorrai, C., D.F. McGinnis, P. Berg, A. Brand, and A. Wüest (2010), Eddy correlation technique for turbulent oxygen flux measurements in aquatic ecosystems, *Journal of Atmospheric and Oceanic Technology*, 27 (9), 1533 – 1546.
- Faure, K., J. Greinert, J. S. von Deimling, D. F. McGinnis, R. Kipfer, and P. Linke (2010) Methane seepage along the Hikurangi Margin of New Zealand: Geochemical and physical data from the water column, sea surface and atmosphere, *Marine Geology*, 272 (1-4 Sp. Iss.), 170-188.
- Flury, S., D. F. McGinnis, and M. Gessner (2010), Methane emissions from a freshwater marsh in response to experimentally simulated global warming and nitrogen enrichment, *J. Geophys. Res.*, 115 (G01007).
- Greinert, J., D. F. McGinnis, L. Naudts, P. Linke, M. De Batist (2010), Atmospheric methane flux from bubbling seeps: Spatially extrapolated quantification from a Black Sea shelf area, *J. Geophys. Res.*, 115 (G01002)

## 2008

- Brand, A., D.F. McGinnis, B. Wehrli, and A. Wüest (2008), Intermittent oxygen flux from the interior into the bottom boundary of lakes as observed by eddy correlation, *Limnol. Oceanogr.*, 53 (5), 1997-2006.
- Holzner, C.P., D.F. McGinnis, C.J. Schubert, R. Kipfer, and D.M. Imboden (2008), Nobel gas anomalies related to high-intensity methane gas seeps in the Black Sea, *Earth and Planetary Science Letters*, 265, 396-409.
- McGinnis, D.F., P. Berg, P. Brand, C. Lorrai, T.J. Edmonds, and A. Wüest (2008), Measurements of eddy correlation oxygen fluxes in shallow freshwaters: Towards routine applications and analysis, *Geophysical Research Letters*, 35 (L04403).
- Ostrovsky, I., D.F. McGinnis, L. Lapidus, and W. Eckert (2008), Quantifying gas ebullition with an echosounder: the role of methane transport by bubbles in a medium-sized lake, *Limnol. Oceanogr.: Methods*, 6, 105-118.

## 2007

- Lam, P., M. M. Jensen, G. Lavik, D. F. McGinnis, B. Müller, C. J. Schubert, R. Amann, B. Thamdrup, and M. M. M. Kuypers (2007), Linking crenarchaeal and bacterial nitrification to anammox in the Black Sea, *PNAS*, 104(17), 7104-7109.
- Schmid, M., M. De Batist, N. Granin, V. A. Kapitanov, D. F. McGinnis, I. B. Mizandrontsev, A. I. Obzhirov, and A. Wüest (2007), Sources and sinks of methane in Lake Baikal - a synthesis of measurements and modeling, *Limnol. Oceanogr.*, 52(5), 1824-1837.

## 2006

- Kourtidis, K., I. Kioutsioukis, D. F. McGinnis, and S. Rapsomanikis (2006), Effects of methane outgassing on the Black Sea atmosphere, *Atmospheric Chemistry and Physics*, 6, 5173-5182.
- McGinnis, D. F., J. Greinert, Y. Artemov, S. E. Beaubien, and A. Wüest (2006), The fate of rising methane bubbles in stratified waters: How much methane reaches the atmosphere?, *Journal of Geophysical Research*, 111(C09007), doi:10.1029/2005JC003183.

- Teodoru, C., D. F. McGinnis, A. Wüest, and B. Wehrli (2006), Nutrient Retention in the Danube's Iron Gate Reservoir, *Eos Trans. AGU*, 87(38), 385.
- McGinnis, D. F., S. Bocaniov, C. Teodoru, G. Friedl, A. Lorke, and A. Wüest (2006), Silica retention in the Iron Gate I Reservoir on the Danube River: The role of side bays as nutrient sinks, *River Res. Applic.*, 22(4), 441-456, doi: 10.1002/rra.916.
- Greinert, J., Y. Artemov, V. Egorov, M. De Batist, and D. McGinnis (2006), 1300-m-high rising bubbles from mud volcanoes at 2080 m in the Black Sea: Hydroacoustic characteristics and temporal variability, *Earth Planet. Sci. Lett.*, 244(1-2), 1-15.
- Schubert, C. J., E. Durisch-Kaiser, C. P. Holzner, L. Klauser, B. Wehrli, O. Schmale, J. Greinert, D. F. McGinnis, M. De Batist, and R. Kipfer (2006), Methanotrophic microbial communities associated with bubble plumes above gas seeps in the Black Sea, *Geochem. Geophys. Geosyst.*, 7(4), doi: 10.1029/2005GC001049.

#### 1998 - 2005

- McGinnis D. F., A. Wüest, C. J. Schubert, L. Klauser, A. Lorke, and R. Kipfer (2005), Upward flux of methane in the Black Sea: Does it reach the atmosphere? In: Lee & Lam (Eds.) - *Environmental Hydraulics and Sustainable Water Management*, Taylor and Francis Group, London: p. 423-429.
- McGinnis, D. F., and A. Wüest (2005), Lake Hydrodynamics. in *McGraw-Hill 2005 Yearbook of Science & Technology*. McGraw-Hill Professional Publishing.
- Lorke, A., D. F. McGinnis, P. Spaak, and A. Wuest (2004), Acoustic observations of zooplankton in lakes using a Doppler current profiler, *Freshwater Biology*, 49(10), 1280-1292.
- McGinnis, D. F., A. Lorke, A. Wüest, A. Stöckli, and J. C. Little (2004), Interaction between a bubble plume and the near field in a stratified lake, *Water Resour. Res.*, 40, W10206, doi:10.1029/2004WR003038.
- Schmid, M., K. Tietze, M. Halbwachs, A. Lorke, D. F. McGinnis, and A. Wüest (2003), How hazardous is the gas accumulation in Lake Kivu? Arguments for a risk assessment in light of the Nyiragongo Volcano eruption in 2002, *Acta Vulcanologica*, 15(1-2), 115-122.
- Burris, V. L., D. F. McGinnis, and J. C. Little (2002), Predicting oxygen transfer rate and water flow rate in airlift aerators, *Water Res.*, 36(18), 4605-4615.
- McGinnis, D. F., and J. C. Little (2002), Predicting diffused-bubble oxygen transfer rate using the discrete-bubble model, *Water Res.*, 36(18), 4627-4635.
- Little, J. C., and D. F. McGinnis (2001), Hypolimnetic Oxygenation: Predicting Performance using a Discrete-Bubble Model. *Water Science & Technology: Water Supply* 1(4): 185-191.
- McGinnis, D. F., and J. C. Little (1998), Bubble dynamics and oxygen transfer in a Speece Cone, *Water Science & Technology*, 37(2), 285-292.

#### **Selected Presentations**

- Greenhouse Gas Emission from the Sea Floor: Methane and CO<sub>2</sub> seepage detection and modelling, *Invited Talk Seminar Series*, Institute for Environmental Sciences, University of Koblenz-Landau, Landau, Germany, November 5, 2009.
- The physics of benthic oxygen fluxes in oscillating environments. *Seminar Series*, Center for Geomicrobiology, Department of Biological Sciences, Aarhus University, Aarhus, Denmark, September 28, 2009.
- Ephemeral benthic methane peaks: understanding the physics of cold seep emissions. *Conference Presentation*, Physical Processes in Natural Waters, Palermo, Italy, September 1 – 4, 2009
- Oxygen Dynamics in the Benthic Boundary Layer: Oxygen eddy correlation in oscillating environments. *Seminar Series*, Research Division 1, IFM-GEOMAR, Leibniz Institute of Marine Sciences, Kiel, Germany, June 3, 2009.

- Physical controls of cold seep methane emission. *Seminar Series*, SURF Department, Eawag, Kastanienbaum, Switzerland, May 18, 2009.
- Eddy correlation technique in natural waters . . . and BBL dynamics. *Seminar Series*, Research Division 1: Ocean Circulation and Climate Dynamics Winter Semester Seminar, IFM-GEOMAR, Leibniz Institute of Marine Sciences, Kiel, Germany, March 2, 2009.
- Bubbles, buoyant plumes and turbulent fluxes in the Black Sea deep water: Where is the methane? *Invited seminar*, IFM-Geomar, Kiel Germany, January 23, 2008.
- Vertical transport of bottom released methane in the water column: Summary of recent findings from CRIMEA (Black Sea) and New Vents (South Pacific). *Invited lecture*, Kempsville Magnet School, December 18, 2007
- Local oxygen fluxes in a riverine reservoir estimated from the eddy-correlation technique. *Fifth International Symposium on Environmental Hydraulics (ISEH V)*, Tempe, Arizona, December 4 – 7, 2007
- Methane transport in the Black Sea: Turbulent fluxes and rising bubbles, *Physical Processes in Natural Waters*, Warnemünde, Germany, September 3 - 6, 2007.
- Development of the discrete-bubble model for turbine aeration systems, *Waterpower XV*, Chattanooga, TN, July 23 – 26, 2007.
- Occurrence and transport of methane in the water column *Invited lecture*, University of Konstanz Limnological Institute. April 27, 2007
- Oxygen fluxes from eddy-correlation measurements: A tale of two lakes. *Sixth International Symposium on Stratified Flows*, Perth, Australia, December 11 – 14, 2006
- Vertical methane fluxes in the Black Sea deep-water: Are there plumes? *Sixth International Symposium on Stratified Flows*, Perth, Australia, December 11 – 14, 2006
- Vertical pathways of methane transport in lakes and oceans: Does it reach the atmosphere? *Invited Lecture*, Virginia Tech, Dept. of Civil and Environmental Engineering, October 13, 2006.
- Turbulence and vertical mixing in the Black Sea: Bridging lakes and oceans. *Coastal and Shelf Seas Conference*, Bangor, UK, April 10-12, 2006