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Spatiotemporal distribution of magnetotactic bacteria in a freshwater pond

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Magnetotactic bacteria (MTB) synthesize nano-sized magnetite or greigite particles and contribute to depositional remanent magnetization in sediments. As yet, the knowledge of MTB distribution in natural environment in the time domain is still limited. In the present study, three morphotypes of MTB, cocci, spirilla and M.bavaricum, were counted using the viable cell technique from the sediment of the Niederlippach pond located 80 km northeast of Munich. Samples were collected and measured each month at 9 sites over a two year period from January 2015 to December 2016. The temporal distribution of MTB species and their relationship with oxygen concentration and temperature were studied. The results show that the temporal variation of spirilla seems to be controlled by temperature and oxygen concentration with a positive correlation between spirilla abundance and temperature and an anti-correlation between spirilla and oxygen concentration. The other two species show a more complex relationship between temperature and/or oxygen concentration despite the fact that they undergo similar temporal variations from most sites in the pond.