Biogeosciences Discuss., 12, C5413–C5415, 2015
www.biogeosciences-discuss.net/12/C5413/2015/

Biogeosciences Discussions
Open Access

Interactive comment on "Ash leachates from some recent eruptions of Mount Etna (Italy) and Popocatépetl (Mexico) volcanoes and their impact on amphibian living freshwater organisms" *by* M. D'Addabbo et al.

F.A. Viehberg (Referee)

finn.viehberg@uni-koeln.de

Received and published: 14 September 2015

The manuscript "Ash leachates from some recent eruptions of Mount Etna and Popocatépetl (Mexico) volcanoes and their impact on amphibian living reshwater organisms" by D'Addabbo et al. describes the authors' observations of leaching experiments in double de-ionised water and filtered (0.2μm) water from Lake Ohrid. Toxicity test on living biota were run with diluted solutions of the leachates using Xenopus FETAX. Element/compound concentrations in leachates were compared with Italian drinking water standards. The authors conclude that the hydrolysis reactions are poorly cor-

related with the duration of ash washed in water. Furthermore the leachates are mild toxic to Xenopus embryo development and exceed drinking water standards. Over all, the manuscript is well written, but the authors should address the following points in more detail.

#1 Published studies on ash leachates are numerous and often concentrate on potential economic/agricultural effects. It seems surprising why the authors have not cited the publication of Morgan and Gislason (2008) (see similarity report). Morgan T. Jones, SigurÃřur R. Gislason, Rapid releases of metal salts and nutrients following the deposition of volcanic ash into aqueous environments, Geochimica et Cosmochimica Acta, Volume 72, Issue 15, 1 August 2008, Pages 3661-3680, ISSN 0016-7037, http://dx.doi.org/10.1016/j.gca.2008.05.030. The aforementioned paper should be used in the discussion as the manuscript will benefit, as several processes seem alike.

Other more recent papers are published and should be addressed, too: among others e.g.,: S.J. Cronin, C. Stewart, A.V. Zernack, M. Brenna, J.N. Procter, N. Pardo, B. Christenson, T. Wilson, R.B. Stewart, M. Irwin, Volcanic ash leachate compositions and assessment of health and agricultural hazards from 2012 hydrothermal eruptions, Tongariro, New Zealand, Journal of Volcanology and Geothermal Research, Volume 286, 1 October 2014, Pages 233-247, ISSN 0377-0273, http://dx.doi.org/10.1016/j.jvolgeores.2014.07.002.

#2 Ammonium vs. Ammonia The authors outline their methods of the leachates analyses in 2.2 Here they outline that the ammonia concentration was measured. In the results 4.2 ammonia concentration is described and mentioned in Table 1 and Fig. 6 (labeled 'ammonium') and Fig. 11. Apparently, the compounds ammonium and ammonia are used synonymously in the text (see P13256 L4). Given the relation of pH-value and the presence of ammonia and/or ammonium in aqueous solutions, I wonder if the hypothesis that "This inference is also supported by the strong correlation among Ca2+, Mg2+ and NH3 (Fig. 11), which indicate the presence of the ammonium 5 as

BGD
12, C5413–C5415, 2015

catalyst for (Ca, Mg) salt dissolution." holds true. More reference work is needed here.

#3 Carbonate A shortcoming of the presented analytical effort is the neglected carbonate compound which can only be vaguely inferred from other parameters. The intention of the manuscript to elucidate the impact of ash-leachates on aquatic ecosystems is weakened as the most common buffer system is not taken into full consideration. Although the authors stress this shortcoming themselves, the discussion continues to neglect the potential reations that at least theoretically contribute to their findings (e.g. delay of emissions, salt formation, stability of compounds...).

#4 Example calculations (see P13260) I encourage the authors to enhance and project their calculations to the case study - Lake Ohrid. The surface and the volume of the lake are known. The authors may even identify published tephra layers from the sediment record of Lake Ohrid, which were strong enough to have altered the lake water substantially (e.g., Y5?). In this context, I also encourage the authors to refer to the "European drinking water directive, 98/83/EG" in addition to the Italian drinking water directives as the implications of the study is not restricted to Italy.

Minor corrections:

P13244 L28 Gíslason P13248 L14 l/min should read Lmin-1 P13248 L18 cations including ammonium P13249 L16 60 mm glass Petri dishes [see p 13249 c13] P13255 L29 should read "gypsum, quartz" P13258 L04 Not the explanation is puzzling P13261 L15 rephrase "ring a bell"

table S7 reference missing for given limits

All figures; concentration is abbreviated by "C". I suggest to use "conc." as capital C is easily confused with the element carbon, especially in plots dealing with other elements. The font size of the figure labels need to be re-checked as most values are too small for publication.

Interactive comment on Biogeosciences Discuss., 12, 13241, 2015.