J Earth Sci Climate Change 2012, 3:3
http://dx.doi.org/10.4172/2157-7617.S1.007

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference on
Earth Science & Climate Change

August 21-22, 2012 Hilton Chicago/Northbrook, USA

Carbon pools in new tephra layers of Mt. Talang (Indonesia) during its initial weathering phase

Dian Fiantis and Malik Nelson[1]
Department of Soil Science, Faculty of Agriculture, AndalasUniversity, Indonesia
[1]Department of Estate Crops, Agriculture Polytechnic Institute, Andalas University, Indonesia

To date, no global data on carbon sequestration at initial weathering phase of tephra deposits are available. To study carbon pools in the new volcanic deposit, tephra layers were reconstructed for a period of 46 months. The tephra samples was collected immediately after eruption of Mt. Talang on April 12th, 2005, over portions of the Solok district in West Sumatra, Indonesia. Potexperiments with/without soil materials(from A horizon and B horizon of Andisol, Oxisol and Ultisol) covered with the collected tephra were conducted in wire half-shaded house. The tephra was applied in 0, 2.5 and 5 cm depths to simulate natural tephra deposition. Every day250 ml of filtered water added and allowed to percolate. Solid fraction from the tephra layer was collected and analyzed at regular intervals and primary plant succession was observedover a period of 4 years. After 2 months, blue-green algae (cyanobacteria) started to colonize the bare surface tephra layer to form an algae mat. After 16 months, the surface was transformed into a green bio-film of lichen. Vascular plants (grasses and shrubs) started to be established after 2 years. Total carbon (TC) content of tephra layer was increased significantly from 0.19% to 1.75% or 8 times higher after 46 months of incubation. Higher TC storage was found in the 2.5 cm compared to that of the 5.0 cm tephra layer which was reconstructed above the soil, with values of 1.75% and 0.89%, respectively. On the contrary, lesser amount of TC was accumulated in the single tephra layer (without soil underneath). Between 71 to 90% of TC was considered as total organic carbon (TOC). The labile organic carbon (LOC) content in the 2.5 cm and 5.0 cm of tephra layer was found to be 0.22 and 0.77%, respectively at the end of incubation. This experiment confirmed the potential of tephra to capture carbon from atmosphere with the help of non-vascular plants and then by vascular plants and finally sink them in the tephra layer.

Biography

Dian Fiantis is currently Professor of Soil Sciences at Faculty ofAgriculture, Andalas University (UNAND). She obtained her PhD degree (2000) from thetwinning program between Universiti Putra Malaysia and Ghent UniversityBelgium. She did postdoctoral studies at the Department of Soil ScienceUniversity of Manitoba, Winnipeg, Canada and Ghent University. She jointthe UNAND upon graduation and promoted to full Professor position on 2009.She has published some papers in reputed peer-review journalsi.e. Geoderma-Elsevier, Communication in Soil Sci. and Plant Anal. ofTaylor and Francis USA, Eurasian Soil Science and Journal of MountainScience of Springer and Malaysian Journal of Soil Science. Her researchinterest covers mineralogy and genesis of tropical volcanic ash soils andbiogeochemical weathering of tephra deposits. Currently, she is thedirector of Laboratory of Soil Survey, Classification and Mapping, Facultyof Agriculture of UNAND.

dianfiantis@yahoo.com

Tailoring materials for CO_2 capture: The amino-effect

Jenny G. Vitillo, Gabriele Ricchiardi and Silvia Bordiga
Dipartimento di Chimica and NIS Centre of Excellence, University of Torino, Italy

Carbon dioxide capture from process is one of the strategies adopted to decrease anthropogenic greenhouse gases emissions. In order to lower the cost associated with the regeneration of amine-based scrubbers systems, one of the envisaged strategies is the grafting of amines on high surface area supports and in particular on metal-organic frameworks (MOFs). In this study, the interaction between CO_2 and aliphatic and aromatic amines has been characterized by quantum mechanical methods (MP2), focusing the attention both on species already reported in MOFs and on new amine-based linkers, in order to inspire the rational synthesis of new high-capacity MOFs. Calculations highlights binding site requisites, with conclusions that are not restricted to the MOFs class of materials, and indicate that CO_2 vibrations are quite independent on the adsorption energy and their monitoring in probe-molecule experiments is not a suitable marker of efficient adsorption

Biography

Jenny G. Vitillo has obtained the PhD in Materials Science in 2005 at the University of Torino, Italy with a thesis on hydrogen storage. Since then she has continued her collaboration with the Physical Chemistry group of the University of Torino on the hydrogen storage and recently on the carbon dioxide separation and activation subject by using different experimental and theoretical techiniques. She is author of 36 articles appeared on ISI journals: between them, two of her articles received about 100 citations and are between the most cited articles in the hydrogen storage field.

jenny.vitillo@unito.it