



World Conference on Ecology

March 19-20, 2018 | Berlin, Germany

Scientific Tracks & Abstracts Day 1

Ecology 2018

Sessions:

Day 1 March 19, 2018

Ecology | Climate Change | Waste recycling: Ecology | Conservation ecology | Pollution: Gist to deal

Session Chair
Gilbert C Sigua
USDA-ARS, USA

Session Co-Chair
Kartlos J Kachiashvili
Georgian Technical University, Georgia

Session Introduction

- Title: Origin of angiosperms/flowers and its botanical implications**
Xin Wang, Nanjing Institute of Geology and Palaeontology, China
- Title: The importance of domestic animal parks for the conservation of agro-biodiversity**
Kai Frolich, Zoo Ark Warder, Germany
- Title: At the limits of growth? – Evidence for impacts of recent climate change on the growth of Quercus robur in relic upland Atlantic oak woodland, Wistmans wood, Dartmoor National Park**
Thomas Murphy, Plymouth University, England
- Title: Assessment of integrated coastal zone management in the Sea of marmara**
Abdullah Bayraktar, Istanbul University, Turkey
- Title: Benthic macroinvertebrates as the bioindicators of freshwater pollution in river Dorr**
Tehmina Qadeer, COMSATS Institute of Information Technology, Pakistan
- Title: Profitability and constraints analysis of fish farming in the southern sector of Ghana**
Amoah Sylvester, University of Ghana, Ghana
- Title: Quantifying historical and future net exchanges of greenhouse gases of CO₂, CH₄ and N₂O between land and the atmosphere in Northern Eurasia**
Qianlai Zhuang, Purdue University, USA
- Title: How does decreasing pH affect the anti-predator response in two species of intertidal snails?**
Shelby C. Bacus, University of California, USA

World Conference on Ecology

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Origin of angiosperms/flowers and its botanical implications

Xin Wang

Nanjing Institute of Geology and Palaeontology, China

Angiosperms are the single most important plant group simply because they are of peerless importance in the ecosystem and the well-being of human beings is out of the question without angiosperms. However, incredibly, as for the origin, history and systematics of such an important group, our understanding is very limited or simply misled. Formerly, Magnoliaceae was mistaken as the most ancestral in angiosperms and recently it was replaced by Amborellaceae, although the provenance of the latter is still mysterious. Analyzing the logic underlying these repeated mistakes, it is easy to find that many botanists were misled by a groundless misnomer in botany, megasporophyll. This is more or less related to the famous word from Goethe, "Alles ist Blatt", and the female parts of reproductive were frequently and irrationally called megasporophylls. This background made angiosperms unacceptably well-isolated from other seed plants and the homology of gynoecium in angiosperms persistently perplexing. However, recent advances in botany and palaeobotany indicate that the foliar nature formerly assumed for carpels in angiosperms is gratuitous, the ovules are borne on branches, and the ovule-enclosing part in gynoecium is mainly foliar in nature. Namely, the so-called carpel in angiosperms is a composite organ derived from formerly a leaf and a branch. Although at odds with the classical conception, this interpretation makes the carpels in angiosperms homologous and comparable with bracts and their axillary ovule-bearing branches in gymnosperms. Thus there is no gap between angiosperms and gymnosperms any more. If the ovules in gymnosperms are taken as specialized megasporangia retained on the mother plants and thus homologous with and comparable to sporangia in ferns and early land plants, then all land plants can be coherently united together into a single tree and the long-after natural systematics of angiosperms and land plants is within the reach of botanists.

Recent Publications

1. Wang X (2018) The dawn angiosperms. Springer. ISBN 978-3-319-58325-9
2. Miao Y, Liu Z J, Wang M and Wang X (2017) Fossil and living cycads say no more megasporophylls. *Journal of Morphology and Anatomy* 1:107.
3. Han G, Liu Z J, Liu X, Mao L, Jacques F M B and Wang X (2016) A whole plant herbaceous angiosperm from the middle Jurassic of China. *Acta Geologica Sinica* 90(1):19-29.
4. Wang X (2010) *Schmeissneria*: An angiosperm from the early Jurassic. *Journal of Systematics and Evolution* 48(5):326-335.
5. Wang X, Liu Z J, Liu W, Zhang X, Guo X, Hu G, Zhang S, Wang Y and Liao W (2015) Breaking the stasis of current plant systematics. *Science & Technology Review* 33:97-105.



Conventional scheme of the automated system for control of river pollution level.

Biography

Xin Wang is one of the few leading Palaeobotanists focusing his research interest on the origin and early evolution of angiosperms/flowers. His unifying theory for the first time united all land plants together through the shared features in the reproductive organs. His research refuted the long and widely accepted but groundless misinterpretation about the origin and homology of flowers. Through his effort the formerly hard to negotiate gap between angiosperms and gymnosperms is filled, and the evolution of all reproductive organs of land plants can be interpreted as the result of varying fate of sporangium. This achievement, especially in a background where molecular systematics dominates, is of especial importance because morphological anatomical features are largely ignored or down-played.

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World Conference on Ecology

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The importance of domestic animal parks for the conservation of agro-biodiversity

Kai Frolich

Zoo Ark Warder, Germany

Domestic animals are one of the most important inventions of man. The special relationship between people and their domestic animals began about 15,000 BC. Domestic animals changed our world and formed our culture. In many generations a great diversity of animal breeds evolved. This is a unique cultural and historical treasure, which we want to preserve for future generations in our park. However, Ark Warder is more than a zoo it is a landscape park and furthermore a research project. Unfortunately this genetic variety, which arose out of thousands of years, is about to become extinct. Every month another rare animal breed vanishes from earth. At this rate, many breeds of old domestic animal are more endangered than some exotic wild species. Ark Warder, conveniently located in Northern Germany, with 40 hectares it is Europe's largest center for rare and endangered domestic animal breeds. Through the park's conservation efforts more than 1,200 animals from 86 different breeds are protected. In order to halt this alarming extinction, five principles guide the conservation efforts of Ark Warder: 1. Conservation through preservation - through this objective, valuable old breeds are maintained and population size is increased. 2. Conservation through the establishment of satellite stations - with pastures distributed outside the park, Ark Warder ensures the protection of breeds against epidemics. These satellite pastures also allow us to increase the gene pool and utilize selected animals for agricultural purposes. 3. Conservation through education - we believe that by educating the general public the genetic diversity of domestic animals be saved. 4. Protection by networking with national and international institutions - In order to work successfully, Ark Warder needs a functioning network. 5. Protection through research - Ark Warder works in close collaboration with various institutions supporting projects on the physiological characteristics of old domestic animal breeds.

Recent Publications

1. Ballweg I C, Froelich K, Fandrey E, Kliem H and Pfaffl M (2016) Comparison of the immune competence of Turopolje, German Landrace × Turopolje, and German Landrace × Pietrain pigs after PRRSV vaccination. *Veterinary Immunology and Immunopathology* 174:35–44.
2. Frölich K and Jandowsky A (2017) Die Bedeutung der Erhaltung vom Aussterben bedrohter Nutztierassen am Beispiel der Arche Warder. *Tierärztliche Praxis Großtiere* 1, 33-41.
3. Ludwig A, Alderson L, Fandrey E, Lieckfeldt D, Soederlund T K and Frölich K (2013) Tracing the genetic roots of the indigenous White Park Cattle. *Animal Genetics*, 44:383-386.
4. Schröder O, Lieckfeldt D, Lutz W, Rudloff C, Frölich K and Ludwig A (2016) Limited hybridization between domestic sheep and the European mouflon in Western Germany. *European Journal of Wildlife Research*, 62(3):307–314.
5. Sorg D, Fandrey E, Frölich K, Meyer H H D and Kliem H (2013) The innate immune response of primary bovine mammary epithelial cells from the ancient White Park and Highland cattle compared to the modern dairy breeds Brown Swiss and Red Holstein. *Animal Genetic Resources*, 52:91-104.

Biography

Kai Frolich is a Doctor of Veterinary Medicine, holding a PhD and additional Master's degree and a second PhD in Biology. Since 2007, he is the Director and Head Veterinarian of the Tierpark Ark Warder – center for rare domestic breeds and since 2014 he is working as a Visiting Professor at the University of Hildesheim at the Department of Biology. From 1992 until 2006 he worked at the Leibniz Institute for Zoo Biology and Wildlife Research Berlin (Head of research group wildlife diseases since 1997). He has long experience in wild and domestic animal species, particularly in infectious diseases. He was the Assistant Editor for *European Journal of Wildlife Research* and *Journal of Wildlife Diseases* and is regional Coordinator of Europe for The World Conservation Union-Veterinary Specialist Group and Vice-Chairman of the board of trustees of Tönnies Foundation. He is author of 14 scientific book chapters and books and 85 scientific peer reviewed papers.

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World Conference on Ecology

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At the limits of growth? – Evidence for impacts of recent climate change on the growth of *Quercus robur* in relic upland Atlantic oak woodland, Wistman's Wood, Dartmoor National Park

Thomas Murphy
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Climate change is perhaps the most important issue of our time with the effects starting to become apparent in altered regional temperature and precipitation regimes. In the context of future climate change projections, it will be critical to understand the response of semi-natural habitats to current changes. Upland oak woodlands in the UK are home to a unique assemblage of plant and animal communities, with Wistman's wood on Dartmoor perhaps the most famous. The woods stunted growth is often cited as an example of a species at its physiological limits, yet its response to recent climate changes has yet to be investigated. This study makes use of weather records from one of the UK's longest upland observation stations at Princetown (>400 m) and other local stations. Data was obtained from the Met Office Integrated Data Archive System (MIDAS) database via the British Atmospheric Data Centre (BADC) and the National Meteorological Archive via the UK Meteorological Office. Cores from *Quercus robur* trees at Wistman's wood were collected using an increment borer in July 2017. Results show the climate on Dartmoor has experienced an increase in precipitation over the last 40 years, all seasons apart from spring show positive trends in total precipitation with autumn, winter and annual trends significant ($P < 0.05$) between 1961–2015. There has also been a significant ($P < 0.05$) increase in mean annual, autumn and winter temperature during 1928–2015. Findings show total precipitation increases whilst not significant at sea level (Plymouth), are ($P < 0.05$) at four upland (>300 m) Dartmoor stations. The study uses dendroclimatic calibration via treeclim in R statistics to analyse the annual growth response of mature *Quercus robur* to evidenced changes in monthly precipitation and temperature over the last 80 years. The results will be presented.

Recent Publications

1. Burt T P and Holden J (2010) Changing temperature and rainfall gradients in British Uplands. *Climate Research* 5:57-70.
2. Christy M, Worth R H (1922) The ancient dwarfed oakwoods of Dartmoor. *Transactions of the Devonshire Association*, 54:291-342.
3. Maddock A (ed.) (2016) UK Biodiversity action plan Priority Habitats Description, Upland Oak wood. JNCC
4. Scharnweber T, Manthey M, Wilmking M (2013) Differential radial growth patterns between beech (*Fagus sylvatica* L.) and oak (*Quercus robur* L.) on periodically waterlogged soils. *Tree Physiology* 33:425-437.
5. Zang C and Biondi F (2013) Dendroclimatic calibration in R: The bootres package for response and correlation function analysis. *Dendrochronologia*, 31:68-74.

Biography

Thomas Murphy is the winner of the Coker memorial prize 2016; Santander seed-corn scholarship 2017 and Scientific Coordinator at Moor Trees. He is a young research Ecologist currently undertaking an Environmental Science Research Master's (ResM) at Plymouth University. He is currently developing a citizen science program for the UK based charity Moor Trees to better understand the impacts of tree planting on floral ecology and subsequent seedling recruitment. His Postgraduate research concentrates on analysing changes in climate at one of England's best known national parks (Dartmoor) and looks to quantify the impacts of altered temperature and precipitation regimes on the recruitment and survival of pedunculate oak (*Quercus robur*), as well as the character of upland oak woodland habitats. He has a strong interest in plant ecology and to understand the implications of climate change on community structure.

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Assessment of integrated coastal zone management in the Sea of Marmara

Abdullah Bayraktar

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Coastal zones are critical areas with their cultural values along with their specific ecological features. Especially by the means of minimizing the environmental pressure on the coastal zones, regarding the conservation and productive use balance, improving the ecological planning approaches is crucial in terms of maintainability of these critical areas. Marmara Region is one of areas of Turkey where industrialization and urbanizing take place the most. Therefore, the Marmara Sea coastal areas face with the problem of massive industrialization and urbanization. Integrated coastal zone management notion emerging from need of usage of coastal zones in the developed countries is an important development for the favorable and useful maintainability of the coasts. All coasts are under environmental pressure and it can be said that it is performed in only a certain number of developed countries. Coastal zones of Turkey are mostly considered as source of income rather than for human benefit. Unfettered usage of activities such as port activities, fishing, transportation, storage, tourism, nuclear power station, socio-cultural activities etc. in the coasts are causing the coasts to fall into ruin in a short span of time. As a result of this rapid and haphazard urbanizing, ecological balance of the sea is exposed to a great deal of deterioration. That reduce in the amount of the oxygen to the minimum level in the interface of Marmara Sea became a threat for the living being-environment relation. What it must be done is to benefit from the unutterable advantages of coasts with the help of modern technology, without damaging ecological environment or minimizing the damage, according to the human needs. All kinds of factors which may cause pollution for maintainable usage of coastal and sea zones must be monitored. In a study conducted, evaluation of integrated coastal zones in Marmara Sea was carried out and problems were profoundly included.

Recent Publications

1. Garipoglu Nuriye and Uzun S Murat (2014) Use of coastal zones in coastal areas in Izmit Bay. Turkish Geography Magazine, Istanbul, Turkey, copy:63 9-22.
2. Naycı Nida (2009), Mass tourism in coastal areas: transformation of coasts within the context of development plan and historical natural environments, social sciences institute magazine, Mugla University, Mugla, Turkey, copy:22
3. Celik Kemal, (2015) The importance of shore edge line in planning the coastal zones, Universal engineering studies magazine, Gumushane, Turkey, book 2, copy:1
4. Kaya H., Aydin A.F, Ertek T. A, Yucel Z.Y., Gazioglu C., (2010), "Storage Shore Example in terms of coastal zone management and planning", VIII. National Conference of Marine and coastal zones of Turkey, ss:1067-1075.
5. Burak Z S (2008) Integrated fresh water sources and coastal zones management. Coasts of Turkey, Ankara, Turkey, ss.35

Biography

Abdullah Bayraktar is a Master student at Istanbul University, Institute of Marine Sciences and Management. He completed his Bachelor's degree in the field of Business Administration. He takes notice the constructive criticism and evaluations with self-confidence and open to improve. His being visionary displays the researcher side of him. His fundamental principles are common sense and equalitarian approach.

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Notes:

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Benthic macroinvertebrates as the bioindicators of freshwater pollution in river Dorr

Tehmina Qadeer¹, Tahir Sarfraz² and Kinza Irshad²

¹COMSATS Institute of Information Technology, Pakistan

²Govt Post Graduate College Mandian Abbottabad, Pakistan

The present study was conducted in river Dorr, district Abbottabad to assess responses of bioindicators towards untreated waste water from Abbottabad city. The sites A and B were studied from January to June 2017. Site A was selected 2km upstream of point source of pollution while site B was selected 2km downstream. Seven bioindicator taxa of macrobenthos were selected viz., Ephemeroptera, Plecoptera, Trichoptera, Coleoptera, Odonata, Diptera and Mollusca. The collection of invertebrates was performed using D-frame kicknet and handpicking. 2205 organisms were collected from site A, belonging to nineteen families. The Ephemeroptera was most diversified and represented by seven families, while Family Rhyacophilidae, Order Trichoptera, was dominant in terms of richness (37.1% individuals). Coleoptera and Odonata, were represented by 0.09% and 1.08% individuals respectively. At site B, a total of 1714 individuals were sampled belonging to eight families. Diptera, the pollution tolerant group, showed dominance in terms of diversity and richness with Family Chironomidae being represented by 67.6% individuals. Coleoptera and Odonata were not encountered at site B at all, while highly pollution sensitive taxon, Plecoptera, was totally absent at both sites. To evaluate degree of pollution, total eleven biological indices were applied including FBI, EPT/C, EPT index, ETO index, %Diptera, %DF, Simpson's diversity index, SIGNAL, CLI, BMWP and ASPT. The overall result of indices regarded site A having excellent aquatic conditions while site B was found to be highly polluted. Functional feeding groups were identified and seven functional feeding group indices were worked out to determine ecological status of the river. The scrapers showed much abundance (55.05%) at site A while gatherer-collectors were dominant (72.8%) at site B downstream. The dominance of certain groups, low richness of predators and absence of shredders revealed ecological disturbances at both sites. The present study revealed that the site A had very good water quality while site B was found to be severely polluted and deteriorated. It is recommended that detailed taxonomic work regarding identification of benthic macroinvertebrates up to species level be carried out and the development of a national scoring system is the dire need for reference and enhanced biomonitoring.

Biography

Tehmina Qadeer has done her bachelor's (hons) in Environmental Sciences and has worked on Ecological management of polluted soil. Currently, she is doing her MS in Environmental Sciences, in CIIT, Abbottabad. Her research work is focused on Ecological restoration of affected areas near industries.

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Notes:

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Profitability and constraints analysis of fish farming in the southern sector of Ghana

Amoah Sylvester, Addey Owusu Prince and Onumah Ebo Edward
University of Ghana, Ghana

The study was aimed at assessing the profitability and constraints faced by fish farmers in the southern sector of Ghana. Four regions in the southern sector were selected, namely, Greater Accra, Volta, Western and Ashanti region. A standardized structured questionnaire were distributed among 320 respondents. A multiple linear regression analytical tool was employed to estimate the factors which affect profitability of fish farming while the Net Farm Income (NFI) analytical tool was used to analyse the cost and returns of fish farming. The weighted average formula was used together with the Kendall's Coefficient of Concordance to analyse the constraints of fish farming. The data was analysed using SPSS (version 24) and STATA (version 14) software. Results from the study showed that farm ownership, educational level, access to market, FBO membership, and extension service significantly affect the profits of fish farming. However, the age, gender, form of sale of fish and type of market were not significant in influencing profit. The mean total cost, revenue and profit of GH 6293.37, GH 12859.44 and GH 6566.07 were obtained respectively. The return on investment was 104.33%. The constraints analysis showed that, high cost of inputs and lack of clear government policies and incentives were the most pressing constraints faced. Aquaculture in the southern sector of Ghana is a profitable business venture, but it is normally on a small scale, and hence the need for commercialization. Aquaculture can greatly contribute to the total reduction in the short falls of demand and supply of fish products in the country and be a potential source of animal protein, income generation and employment. More extension officers should be deployed to the southern sector to educate fish farmers on the best fish farming practices. Government should build processing factories to facilitate fish storage, processing and marketing.



Figure 1: A conceptual view of the factors which greatly influence the profitability of fish farming.

Recent Publications

- Odei Kwame, D. (2015). Sustainable Development of Aquaculture on the Volta Lake- A case study of the Asuogyaman District in the Eastern Region of Ghana. University of Tromso on Urban Localities. 131 Ghana: Ghana Statistical Service
- Ghana Statistical Service (2013). 2010 Population and Housing Census: National Analytical Report. http://www.statsghana.gov.gh/docfiles/2010phc/National_Analytical_Report.pdf
- Cobbina, R. (2010). Aquaculture in Ghana: Economic Perspectives of Ghanaian Aquaculture for Policy Development. Ministry of Food and Agriculture, Fisheries Commission. United Nations University
- Asmah, R. (2008). Development potential and financial viability of fish farming in Ghana. Bsc(Hons) Chemistry, M.Sc Ecological Marine Management. Institute of Aquaculture. University of Stirling
- FishLore.com (2007). Tropical Fish Tank Care & Aquarium Maintenance. In: Tropical Fish. Information. [Online] Available at: www.fishlore.com/maintenance.htm
- Food and Agriculture Organization of the United Nations (FAO) (2000). The State of World Fisheries and Aquaculture 2000. Rome, Italy.

Biography

Amoah Sylvester is an Mphil Agribusiness II student and a Junior Research Scientist in the department of Agricultural Economics and Agribusiness, University of Ghana. I had my Bsc. Degree in Agriculture with Agribusiness major. I am an expert in drafting proposals for academic research, data entry and analysis. My experience coupled with hard work gave me the opportunity to work with International Food Policy Research Institute (IFPRI), Accra-Ghana of which I have been able to learn new econometric tools for data analysis and research.

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World Conference on Ecology

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Quantifying historical and future net exchanges of greenhouse gases of CO₂, CH₄ and N₂O between land and the atmosphere in Northern Eurasia

Qianlai Zhuang¹, Tong Yu¹, David W Kicklighter², Jerry Melillo², Yongxia Cai³, John Reilly³, Andrei Sokolov³, Erwan Monier³, Andrey Sirin³, Nadja Tchebakova⁴, V.N. Sukachev⁴, Shamil Maksyutov⁵ and Anatoly Shvidenko⁶

¹Purdue University, USA

²The Ecosystems Center of the Marine Biological Laboratory, USA

³Massachusetts Institute of Technology, USA

⁴Russian Academy of Sciences, Russia

⁵National Institute for Environmental Studies, Japan

⁶International Institute for Applied Systems Analysis (IIASA), Austria

The largest increase of air temperature and climate extremes have occurred in Northern Eurasia in recent decades, and are projected to continue during this century. The changing climate will affect biogeography, land cover, and carbon sink and source activities, which in turn, will affect how global land use evolves in the future as humans attempt to mitigate and adapt to climate change. Regional land-use changes, however, also depend on pressures imposed by the global economy and environmental changes. Feedbacks from future land-use change will further modify regional and global biogeochemistry and climate. This study uses a suite of linked biogeography, biogeochemical, economic, and climate models to explore how vegetation shifts in Northern Eurasia will influence land-use change, carbon cycling and biomass supply across the globe during the 21st century. We find that, at the global scale, while more land will be allocated towards food and biofuel crops (from current 22 to 37 million km² at the end of the 21st century) due to increasing population and associated economic development, and changes of land use and vegetation shift in northern Eurasia, under the no-policy scenario. The affected global land-use change and climate result in a global cumulative carbon sink of 52 PgC under the no-policy scenario (where CO₂ equivalent green house gas concentrations reach 870 ppmv by the end of 21st century), while under the policy scenario (limits CO₂ equivalent greenhouse gas concentrations to 480 ppmv by the end of this century), the cumulative carbon is sink of 63 Pg C. The global biomass supply will decrease 36 and 14 Pg under the no-policy and policy scenarios, respectively. In the presentation, we will also discuss our analysis on N₂O and CH₄ exchanges between the biosphere and the atmosphere in response to the changes of land cover and climate during this century.



Figure 1. The linkages between the economic model, the AOGCM, and the TEM are simulated as a loosely coupled system, running EPPA to produce emissions scenarios, then the AOGCM with a reduced form version of TEM to produce climate scenarios, and then the TEM driven by climate and land use scenarios to produce productivity impacts. EPPA is then rerun with these productivity impacts, producing new scenarios of land use change, and TEM is rerun to estimate CO₂ and other trace gas impacts of the final land use scenarios.

World Conference on Ecology

March 19-20, 2018 | Berlin, Germany

Recent Publications

1. Liao, C., & Zhuang, Q. (2017). Quantifying the role of snowmelt in stream discharge in an Alaskan watershed: An analysis using a spatially distributed surface hydrology model. *Journal of Geophysical Research: Earth Surface*, 122. <https://doi.org/10.1002/2017JF004214>
2. Tan, Z., Zhuang, Q., Shurpali, N. J., Marushchak, M. E., Biasi, C., Eugster, W, and Anthony, K. W (2017), Modeling CO₂ emissions from Arctic lakes: Model development and site-level study, *J. Adv. Model. Earth Syst.*, 9, doi:10.1002/2017MS001028
3. Zhu, P., Q. Zhuang, P. Ciais, L. Welp, W. Li, and Q. Xin (2017), Elevated atmospheric CO₂ negatively impacts photosynthesis through radiative forcing and physiology-mediated climate feedback, *Geophys. Res. Lett.*, 44, doi:10.1002/2016GL071733
4. Jin, Z., Zhuang, Q., Wang, J., Archontoulis, S. V., Zobel, Z. and Kotamarthi, V. R. (2017), The combined and separate impacts of climate extremes on the current and future US rainfed maize and soybean production under elevated CO₂. *Glob Change Biol.* doi:10.1111/gcb.13617
5. Zhuang, Q., Zhu, X., He, Y., Prigent, C., Melillo, J. M., McGuire, A. D., Prinn, R. G., and Kicklighter, D. W. (2015), Influence of changes in wetland inundation extent on net fluxes of carbon dioxide and methane in northern high latitudes from 1993 to 2004, *Environ. Res. Lett.* 10 (2015) 095009.

Biography

Qianlai Zhuang's research focuses on the interactions among atmosphere, biosphere, and human dimension in the context of climate change, chemical element cycles, and policy-making. One of his major research activities is on carbon exchanges between terrestrial ecosystems and the atmosphere by investigating how changes of climate, soil physics (e.g., permafrost dynamics, change of soil moisture), atmospheric chemicals (e.g., CO₂ and O₃), land-use and land-cover (e.g., fire disturbances), affect the carbon assimilation and decomposition with both process-based and inversion modeling approaches. My second major research activity is on modeling CH₄ exchanges between the atmosphere and terrestrial ecosystems. My third major research activity is on analyzing consequences of air pollutants for ecosystem services and the economy.

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Notes:

World Conference on Ecology

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How does decreasing pH affect the anti-predator response in two species of intertidal snails?

Shelby C Bacus
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Predator-prey interactions are often complex and seemingly small disruptions in the system can have large consequences. As anthropogenic CO₂ emissions continue to increase and the ocean acidifies in a process called ocean acidification, many marine organisms are documented showing maladaptive behavioral responses. This paper studies the effect of decreasing pH on the response of two important intertidal snails, *T. funebris* and *T. brunnea*, when exposed to predator-conditioned water. Both species live at different heights in the intertidal and are exposed to distinctly different pH conditions. Five discrete pH levels were assessed in this experiment ranging from 7.7-6.5. The results demonstrate that *T. funebris* and *T. brunnea* both exhibit a degraded anti-predator response at low pH, and that their responses do not significantly vary between species. This study suggests that *T. brunnea* is more tolerant to low pH conditions than previously predicted, and that both species are at risk in a projected acidified ocean.

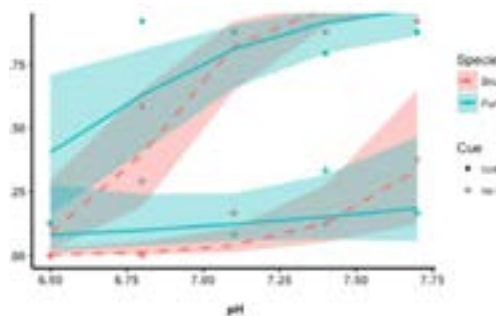


Figure 4. Effect of pH on proportion of time spent out of the water when *T. funebris* and *T. brunnea* were exposed to cue and no cue. Solid shaded lines represent their respective logistic regression lines and shaded areas represent 95% confidence intervals.

Biography

Shelby Bacus is currently finishing her B.S in Marine and Coastal Science at the University of California-Davis. She has spent the majority of her last year at university conducting research at Bodega Marine Laboratory investigating how physical and biological stressors affect marine invertebrates. After graduating she plans on pursuing her Ph.D. in marine ecology and biological oceanography.

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Notes:



World Conference on Ecology

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Scientific Tracks & Abstracts Day 2

Ecology 2018

Sessions:

Day 2 March 20, 2018

Biodiversity | Natural Resources | Ecological Sustainability | Marine Ecology

Session Chair

Fang Yiping

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Session Introduction

- Title: The effect of intraspecific trait variation on the detecting of community assembly**
Zhanqing Hao, Chinese Academy of Sciences, China
- Title: An assessment of one temporary wetland regeneration after soil disturbance**
Nargis Sahib, Mohamed I University, Morocco
- Title: A new approach to ecological data management**
Frank Schlaeger, KISTERS AG, Germany
- Title: Deforestation trends and forest transitions in tropical landscapes**
Kiswanto, Mulawarman University, Indonesia
- Title: The frequency rates of iron deficiency anaemia among Saudi female who attending to before marriage clinic examination**
Rana Ghazi Zaini, Taif University, Saudi Arabia
- Title: Challenges in intermittent river assessment: Prospects for an unexpected obscure animal group (Acari: Hydrachnidia)**
Ivana Pozojevic, University of Zagreb, Croatia
- Title: Water as a resource – Simultaneous comparison of abundance and deficiency worldwide**
Jovan Dimishkovski, Brandenburg University of Technology, Germany
- Title: Impacts of permafrost thaw on carbon sequestration of wetlands in cold region of Northeast China**
Changchun Song, Chinese Academy of Sciences, China
- Title: Mangrove Restoration and Rehabilitation : KeSEMaT rehabilitates mangrove ecosystems become mangrove education center of KeSEMaT (MECoK)**
Aulia Putri Aji, Kelompok Studi Ekosistem Mangrove Teluk Awur (KeSEMaT), Indonesia

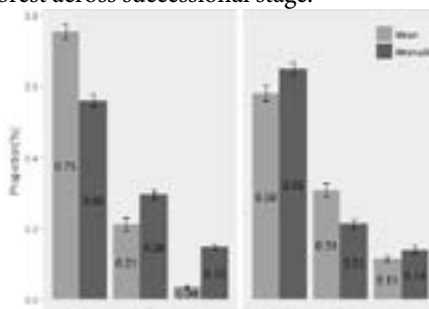
World Conference on Ecology

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The effect of intraspecific trait variation on the detecting of community assembly

Zhanqing Hao and Shuai Fang
Chinese Academy of Sciences, China

Trait based approach are widely used in the study of different process (dispersal limitation, habitat filtering and limitation similarity) underlying community assembly. However, most researches are based on trait mean value, which only consider interspecific trait variation. Due to the genetic and environmental difference, functional trait can also exhibit significant intraspecific trait variation (ITV). Thus disentangle whether and how will the detection of relative importance of ecological process be influenced by the inclusion of ITV is of significant meaning for our understanding of community assembly. Here, we collected community composition data and 8 functional traits in a young (24-ha) and old (25-ha) growth forest plot. We analyzed the relative importance of different process based a recent developed modeling technique (STEPCAM). Moreover, we detect the effect of ITV on the relative importance with and without ITV. We found that dispersal limitation are most important at 20 m in two forest plot, followed by habitat filtering, and limiting similarity had minor effect. When taking ITV into consideration, the proportion of deterministic process (habitat filtering and limiting similarity) improved at early successional stage, while such effect was not found at late successional stage. Moreover, based on single trait, we found the deterministic process only improved for the nutrition absorb related trait when we consider of ITV at late successional stage, which imply the importance of soil condition on community assembly at this scale. In conclusion, our study highlights the importance of ITV for the detection of trait based ecological process in this temperate forest across successional stage.



Recent Publications

1. Z Yuan, A Gazol, F Lin, X Wang, et al. (2016) Scale-dependent effect of biotic interactions and environmental conditions in community assembly: insight from a large temperate forest plot. *Plant Ecology* 217(8):1003-1014.
2. Z Yuan, A Gazol, X Wang, et al., (2016) Pattern and dynamics of biomass stock in old growth forests: The role of habitat and tree size. *Acta Oecologica* 75:15-23.
3. X Wang, T Wiegand, N J B Kraft, et al. (2016) Stochastic dilution effects weaken deterministic effects of niche-based processes in species rich forests. *Ecology* 97(2):347-360.
4. X Wang, H Li, T M Bezemer and Z Hao (2016) Drivers of bacterial beta diversity in two temperate forests. *Ecological Research* 31(1):57-64.
5. X Wang, T Wiegand, N G Swenson et al. (2015) Mechanisms underlying local functional and phylogenetic beta diversity in two temperate forests. *Ecology* 96(4):1062-1073.

Biography

Zhanqing Hao is focused on the biodiversity and ecological functions. As one of the Chinese Scientists who participated in biodiversity research, he initiated the establishment of 25-ha temperate permanent monitoring forest plot in Northeast China at 2004, which is the earliest temperate forest plot in China and had been an important member of Chinese Forest Biodiversity Monitoring Network (CFoBio). After that, a series of forest plots had been established along successional stages and latitude gradients. Those entire forest plots provided the opportunity to detect the biodiversity patterns and maintaining mechanisms in temperate forests.

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World Conference on Ecology

March 19-20, 2018 | Berlin, Germany

An assessment of one temporary wetland regeneration after soil disturbance

Nargis Sahib

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Mediterranean temporary wetlands are shallow, small and frequently visited habitats where domestic livestock and wild herbivores generate numerous physical soil disturbances that affect the biomass, species composition and richness of plant communities, with an unknown effect on communities dynamic and speed of regeneration. The present study is a combination of a laboratory and field experiments, in order to verify these hypotheses concerning the vegetation of temporary wetlands. In field, using two sizes of experimental plots (large: 1.20 m x 1.20 m; small: 0.3 m x 0.3 m), the effects of soil disturbances on vegetation dynamics and the vertical distribution of seeds were studied in one Moroccan temporary wetland. In laboratory experiment was carried out using 72 soil samples collected from the same temporary wetland and placed in containers. The total biomass, the annual and perennial species richness was calculated to test the hypothesis. Results show that disturbance reduces the total biomass, especially of perennials, but without significantly increasing the richness of annuals, but a very rapid regeneration of temporary wetland vegetation in disturbed plots. The speed of regeneration depends on the size of disturbance and hydrology. There was an almost complete return of vegetation to the reference state in the small disturbed plots by the end of the 1st year. This fast restoration was mainly due to seed banks, which play a key role in the regeneration of temporary wetland to the different sizes of disturbances frequently generated by herbivores, but also to lateral colonization by perennials.

Recent Publications

1. Sahib N, Rhazi L and Grillas P (2011) Post-disturbance dynamic of plants in a Mediterranean temporary pool (Western Morocco): Effects of disturbance size. *Canadian Journal of Botany*, 89:105-118.
2. Sahib N, Rhazi L, Grillas P and Rhazi M (2010) Impacts of physical soil disturbance on plant communities in temporary ponds in Morocco. *EPCN Newsletter*, 5:11-12.
3. Sahib N, Rhazi L, Grillas P and Rhazi M (2009) Experimental study of the effect of hydrology and mechanical soil disturbance on plant communities in Mediterranean temporary pools in Western Morocco. *Hydrobiologia* 634:77-86.
4. Bouahim S, Rhazi L, Amami B, Sahib N, Grillas P, Rhazi M and Mesleard F (2008) Le pâturage dans les mares temporaires méditerranéennes : effet sur la richesse des communautés et conséquences pour la gestion. In : Bonis A. (ed.). Editions Tec & Doc Lavoisier, Paris : pp. 39-46.
5. Bouahim S, L Rhazi, B Amami, Sahib N, M Rhazi, A Waterkeyn, A Zouahri, F Mesleard, S D Muller and P Grillas (2010) Impact of grazing on the species richness of plant communities in Mediterranean temporary pools (western Morocco). *Comptes Rendus Biologie* 333:670-679.

Biography

Nargis Sahib while performing her PhD work mainly focused on the ecology of plant communities of temporary wetlands in the western of Morocco. She was especially interested in studying the impact of soil disturbance on richness and community dynamic. She combined field surveys, experiments in the field (soil disturbance simulation experiment) and in the laboratory. She is working as an Assistant Professor at Mohamed Ist, University, Faculty of Science Oujda (Morocco).

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Notes:

World Conference on Ecology

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A new approach to ecological data management

Frank Schlaeger¹, and Vicky Isaac²

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²KISTERS Pty Australia

Ecological surveys are an extremely important tool used to assess the condition of terrestrial and aquatic ecological resources. However there are many and varied challenges when it comes to storing, managing and reporting on this type of data, not least of which is the inherent complexity and inhomogeneity of the data. It is difficult to provide a single consistent system to effectively rationalise these differing datasets. Ecological surveys can employ many different sampling methodologies to obtain unbiased and representative data to achieve realistic estimates at a given location. Examples of potential sampling methods include: transects/quadrats, nested plots, stratified random samples, catchment/reaches, stations/subplots/seedling plots/tiers. Ideally a system should be flexible enough to not only allow the data to be structured to cater for the different methodologies but have the ability to spatially represent these features as either points, lines or polygons. In addition to environmental or habitat related data, additional metadata is also often captured in regards to sampling methods, techniques and other survey variables (e.g. fished width, electric fishing equipment etc.) or data related to the sample analysis (e.g. processing method/agency etc.). This can be simple or other cases quite complex depending on the sampling and analysis techniques employed. The new system was developed to solve these fundamental ecological data storage issues. Using the flexibility and functionality of a flexible metadata framework and GIS systems, the system provides a solid, generic framework for the storage of all kinds of ecological survey data. Spatial data storage has been expanded to include the representation of points, lines and polygons through the use of the OGC standard – Well Known Text (WKT) format (<http://www.opengeospatial.org/standards/wkt-crs>) e.g.

- POINT(1760763 5850664)
- LINESTRING(1746645 5726986, 1746721 5727029)
- POLYGON((1825347 5884361, 1825276 5884348, 1825259 5884429, 1825335 5884437, 1825347 5884361))



The system provides a four tiered sampling locational hierarchy and all levels of the hierarchy can be georeferenced in WKT format. The hierarchy can be implemented differently for different types of surveys. For example Marine reef surveys at Auckland Regional Council were implemented in the new system as follows: Observation attributes are a specialised feature of the new system that allows taxa related biological data to be stored. A biological observation is a combination of a taxon, an attribute and a value. The taxonomic elements of the taxonomic tree are linked to parameter types, whilst observation attributes are linked to an observation type. In this way we can store any combination of data that can be specific to only a given type of data. E.g. BIRDS: *Cyathea medullaris*, Presence = Yes In order to demonstrate the practical suitability of the new approach to ecological data management the presentation will focus on the implementation of the new system at Natural Resources Wales (NRW) and Auckland Regional Council (NCR).

Biography

Frank Schlaeger, has received his PHD in water quality simulation of lignite mining affected rivers. He is employed in senior roles at KISTERS for over 15 years. During this time, he has overseen many large water quality and ecology implementation projects worldwide. He was instrumental in the guidance of the development of KISTERS water quality and ecology management software. KISTERS software solutions for the sustainable management of environmental data are based on modern technology and in-depth understanding of application areas and markets.

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World Conference on Ecology

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Deforestation trends and forest transitions in tropical landscapes

Kiswanto¹ and Satoshi Tsuyuki²

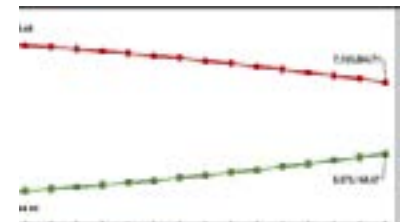
¹Mulawarman University, Indonesia

²The University of Tokyo, Japan

Tropical rainforests are some of the wealthiest home to probably 50 percent of the world's terrestrial species and also helps to maintain the climate by regulating atmospheric gases and stabilizing rainfall, protecting against desertification and providing numerous other ecological functions. Unfortunately, prospects for tropical forests are becoming increasingly bleak owing to unabated deforestation and forest alteration that stem from human activities such as logging, hunting, agricultural expansion and human settlement. Many drivers of land cover change left traceable footprints in their wake, which can be observed from satellite imagery. An essential concept for trends in deforestation is the forest transitions, a well-established pattern of how deforestation in region increases, then decreases, and finally to reforestation over the course of time. For showing the yearly land cover and land cover changes over time, as a case study in East Kalimantan Province (Indonesia), we produced yearly land cover maps from 2000 to 2016 using Landsat imageries interpreted visually and then analyzed land cover changes during 17 years, including a total of forest cover over time. In this study, we analyzed annual deforestation trends and estimated the forest transitions during 17 years. Our results indicated forest loss especially in the natural forest, was caused by decreasing of forest quality, i.e. changes from primary to secondary forest, from secondary forest to shrubland, etc. Forest gain was only seen in plantation forest that was changed from primary and secondary dryland forest.

Recent Publications

1. BP-REDD+ (Indonesian REDD+ Agency). 2015. National Forest Reference Emission Level for Deforestation and Forest Degradation in the Context of the Activities Referred to in Decision 1/Cp.16, Paragraph 70 (REDD+) Under the UNFCCC : A Reference for Decision Makers. Published by BP-REDD+ Indonesia.
2. FAO (Food and Agriculture Organization of the United Nations). 2010. Global Forest Resources Assessment 2010. FAO Forestry Paper 163. Rome.
3. FAO (Food and Agriculture Organization of the United Nations). 2015. Global Forest Resources Assessment 2015: How are the world's forests changing?. Rome.
4. IPCC (Intergovernmental Panel on Climate Change). 2003. Good Practice Guidance for Land Use, Land-Use Change and Forestry. IPCC National Greenhouse Gas Inventories Programme. Published by the Institute for Global Environmental Strategies (IGES) for the IPCC. Japan.
5. ITTO (International Tropical Timber Organization). 2002. ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests. ITTO Policy Development Series No. 13 in collaboration with the Center for International Forestry Research (CIFOR), the Food and Agriculture Organization of the United Nations (FAO), the International Union for Conservation of Nature (IUCN) and the World Wide Fund for Nature (WWF) International.
6. MoF (Ministry of Forestry), Republic of Indonesia. 2004. Minister of Forestry Regulation No. P.14/Menhut-II/2004 on The Procedures for Afforestation and Reforestation in the Framework of Clean Development Mechanism. Jakarta.
7. MoF (Ministry of Forestry), Republic of Indonesia. 2009. Minister of Forestry Regulation No. P.30/Menhut-II/2009 on The Procedures for Reduction Emission from Deforestation and Forest Degradation. Jakarta.



Biography

Kiswanto is a Lecturer in Forestry Faculty of Mulawarman University, Indonesia. Since 2015, he is taking PhD course at the Graduate School of Agricultural and Life Sciences, the University of Tokyo, Japan under supervision of Associate Professor Satoshi Tsuyuki, PhD. His research topic is the silvicultural strategies of landscape restoration for reducing GHG emissions from deforestation and forest degradation in East Kalimantan Province, Indonesia. During this PhD research work, he produced yearly land cover maps from 2000-2016 using Landsat interpreted visually and analyzed land cover changes over time, to monitor deforestation trends and forest transitions, estimate GHG emissions from deforestation and forest degradation, and formulate the silvicultural strategies of landscape restoration.

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Challenges in intermittent river assessment: Prospects for an unexpected obscure animal group (Acari: Hydrachnidia)

Ivana Pozojevic¹, Vladimir Pesic², Stubbington Rachel³, Sanja Gottstein¹, Milisa Marko¹ and Datry Thibault⁴

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²University of Montenegro, Montenegro

³Nottingham Trent University, UK

⁴Centre de Lyon-Villeurbanne - Irstea, France

Water mites have complex life cycles, synchronizing five life stages according to host, prey and habitat availability and in intermittent rivers (IRs), to dry periods as well. Multiple connections of water mites to the environment make them sensitive to any changes and consequently, good bioindicators. Their dynamics and potential in intermittent river bioassessment is discussed. Nine study sites from seven karst rivers, where intermittency naturally occurs, were analyzed in order to assess water mite occurrence along several hydrological metric gradients. The sites ranged from perennial or rarely ceasing flow to regularly ceasing flow or extremely intermittent categories. Water quality indices that include water mites (PTH and PTHfam index, Plecoptera, Trichoptera, Hydrachnidia) were tested and compared with the EPT index (Ephemeroptera, Plecoptera and Trichoptera) in order to test their applicability in intermittent river monitoring. Water mites positively associated with unstable hydrological conditions (drying events with greater unpredictability) showed morphological features (swimming setae) typical for lentic habitats. On the other hand, crawling mites (inhabiting both lentic and lotic hydrosystems) were found to positively correlate with higher values of both the PTH and EPT indices (higher quality classes). The PTH and PTHfam indices were (significantly) positively correlated with the EPT, showing slightly higher quality values (classes) in IRs when compared to the values of the EPT index. Water mites can thus be considered as indicators that bridge the gap IR bioassessment caused by insect taxa sensitive to flow intermittency and pristine, naturally intermittent rivers.

Recent Publications

1. Pozojevic, Ivana; Brigic, Andreja; Gottstein, Sanja. Spatial distribution and seasonal changes of water mite assemblages (hydrachnidia) in dinaric karst springs // 10 Symposium for European freshwater sciences 2017 abstract book.
2. Pozojevic, Ivana; Pesic, Vladimir; Gottstein, Sanja. Surviving the dry phase: Water mite (Acari: Hydrachnidia) adaptations to flow intermittency in karst rivers // The Book of Abstracts 7th International Symposium of Ecologists of Montenegro-ISEM7
3. Vuckovic, Natalija; Vilenica, Marina; Kralj, Tomislav; Pozojevic, Ivana; Milisa, Marko; Kerovec, Mladen; Ternjej, Ivančica; Mihaljevic, Zlatko. Littoral macroinvertebrate communities in reservoirs of the Dinaric karst of Croatia // 10th Symposium for European Freshwater Sciences.
4. Pozojevic, Ivana; Lajtner, Jasna; Rubinic, Josip; Barac, Ivica; Gottstein, Sanja. Key zoobenthos inhabitants as indicators of hydrological dynamics in karst springs // Book of abstracts and programme. 2nd Central European Symposium for Aquatic Macroinvertebrate Research.
5. Pozojevic, Ivana; Gottstein, Sanja; Mihaljevic, Zlatko. Strategije prezivljavanja vodengrinja (Acari: Hydrachnidia) u rijekama Hrvatske koje presusuju // Knjiga sazetaka (Simpozij o biologiji slatkih voda, USB)

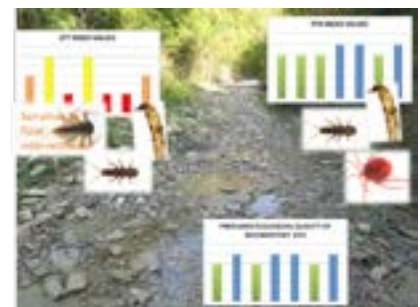


Figure 1: Graphical abstract of conference paper

Biography

Ivana Pozojevic is a PhD student at the Department of Biology, Faculty of Science at the University of Zagreb, Croatia. Her research focuses on the community ecology of springs, intermittent rivers and freshwater organisms, and she is especially interested in water mites (Hydrachnidia).

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World Conference on Ecology

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Water as a resource – Simultaneous comparison of abundance and deficiency worldwide

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This paper presents a very up-to-date topic about water as a resource. Water is described as something whose abundance or deficiency should be critically examined. An important emphasis is put on approaches to seawater desalination and drinking water supply in arid areas. Finally, a summary of the selected topic is given. It is generally known that water is the source of life and that it plays a crucial role in everyday life, economy and industry. All in all, the development of human civilization is inextricably linked to water. At the same time, ground water is a drinking water dispenser and habitat. It is important for people as well as for the economy. We use water for nutrition, daily hygiene, our leisure activities, etc. Water is also a major factor in economy as an energy source, transport medium and raw material. Sustainable use and biodiversity are important prerequisites for effective protection of the water resources. For these reasons, the exploration of the chosen subject in this paper has been devoted to the most decisive factors referring to the water resources. For example, the global climate changes worldwide, the population growth and the industrialization of the developing countries. In this paper, several water-related problems are treated. First, the importance of water in our lives is presented. Then, it is gone deeper into the focus on global overflow and water deficiency. Second, a few approaches to seawater desalination and drinking water supply in arid areas are presented. In addition, water policies in the water sector are analyzed and an outlook for the future is given. In the conclusion, a summary of the results is presented.

Recent Publications

1. Blue Responsibility - Initiative des VDMA Fachverband Armaturen und des Industrie Forum Sanitär (2012): Wasserpreise Industrienationen.
2. Deutsche UNESCO-Kommission (2014): Weltwasserbericht 2014 – Zusammenfassung.
3. Grambow, M. (2013): Nachhaltige Wasserbewirtschaftung – Konzept und Umsetzung eines fernünftigen Umgangs mit dem Gemeingut Wasser, Wiesbaden: Springer Vieweg & Taubner Verlag.
4. LWG Lausitzer Wasser GmbH & Co. KG (2017): Trinkwasserpreise und Vertragsbedingungen.
5. Schneckener, U., von Scheliha, A., Lienkamp, A. & Klagge, B. (2014): Wettstreit um Ressourcen - Konflikte um Klima, Wasser und Boden, München: Oekom Verlag, Gesellschaft für ökologische Kommunikation mbH.

Biography

Jovan Dimishkovski is in the last year of his second bachelor's studies, doing a specialization in the field of Environmental Engineering and Ecology at the Technical University in Cottbus, Germany. He has participated in the organization, planning and negotiation of projects and conferences such as XIX International Eco Conference (Novi Sad, Serbia, 2015), International Symposium on Tourism and Sustainable Development (Timisoara, Romania, 2014), Wastewater Congress (Istanbul, Turkey, 2013) and he has participated in research and construction projects such as eco-lawnmowers, elevator construction and design, fish-climbing systems - historical and current development, were successfully completed.

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Notes: