บทความที่น่าสนใจประจำเดือนพฤศจิกายน 2559

สาขาวิทยาศาสตร์และเทคโนโลยี

1	Title:	Global Ocean Integrals and Means, with Trend Implications
	Author:	Carl Wunsch
	Journal:	Annual Review of Marine Science, Volume 8, 2016, pp. 1-33
	Abstract:	Understanding the ocean requires determining and explaining global integrals and equivalent average values of temperature (heat), salinity (freshwater and salt content), sea level, energy, and other properties. Attempts to determine means, integrals, and climatologies have been hindered by thinly and poorly distributed historical observations in a system in which both signals and background noise are spatially very inhomogeneous, leading to potentially large temporal bias errors that must be corrected at the 1% level or better. With the exception of the upper ocean in the current altimetric-Argo era, no clear documentation exists on the best methods for estimating means and their changes for quantities such as heat and freshwater at the levels required for anthropogenic signals. Underestimates of trends are as likely as overestimates; for example, recent inferences that multidecadal oceanic heat uptake has been greatly underestimated are plausible. For new or augmented observing systems, calculating the accuracies and precisions of global, multidecadal sampling densities for the full water column is necessary to avoid the irrecoverable loss of scientifically essential information.
	Database:	Annual Review

2	Title:	The Impact of Submesoscale Physics on Primary Productivity of Plankton
	Author:	Amala Mahadevan
	Journal:	Annual Review of Marine Science, Volume 8, 2016, pp. 161-184
	Abstract:	Life in the ocean relies on the photosynthetic production of phytoplankton, which is influenced by the availability of light and nutrients that are modulated by a host of physical processes. Submesoscale processes are particularly relevant to phytoplankton productivity because the timescales on which they act are similar to those of phytoplankton growth. Their dynamics are associated with strong vorticity and strain rates that occur on lateral scales of 0.1–10 km. They can support vertical velocities as large as 100 m d^{-1} and play a crucial role in transporting nutrients into the sunlit ocean for phytoplankton production. In regimes with deep surface mixed layers, submesoscale instabilities can cause stratification within days, thereby increasing light exposure for phytoplankton trapped close to the surface. These instabilities help to create and maintain localized environments that favor the growth of phytoplankton, contribute to productivity, and cause enormous heterogeneity in the abundance of phytoplankton, which has implications for interactions within the ecosystem.
	Database:	Annual Review

3	Title:	Growth Rates of Microbes in the Oceans
	Author:	David L. Kirchman
	Journal:	Annual Review of Marine Science, Volume 8, 2016, pp. 285-309
	Abstract:	A microbe's growth rate helps to set its ecological success and its contribution to food web dynamics and biogeochemical processes. Growth rates at the community level are constrained by biomass and trophic interactions among bacteria, phytoplankton, and their grazers. Phytoplankton growth rates are approximately 1 d^{-1}, whereas most heterotrophic bacteria grow slowly, close to 0.1 d^{-1}; only a few taxa can grow ten times as fast. Data from 16S rRNA and other approaches are used to speculate about the growth rate and the life history strategy of SAR11, the most abundant clade of heterotrophic bacteria in the oceans. These strategies are also explored using genomic data. Although the methods and data are imperfect, the available data can be used to set limits on growth rates and thus on the timescale for changes in the composition and structure of microbial communities.
	Database:	Annual Review

4	Title:	A Bayesian network model for predicting aquatic toxicity mode of action using two dimensional theoretical molecular descriptors
	Author:	John F. Carriger, Todd M. Martin, Mace G. Barron
	Journal:	Aquatic Toxicology, Volume 180, November 2016, Pages 11–24
	Abstract:	The mode of toxic action (MoA) has been recognized as a key determinant of chemical toxicity, but development of predictive MoA classification models in aquatic toxicology has been limited. We developed a Bayesian network model to classify aquatic toxicity MoA using a recently published dataset containing over one thousand chemicals with MoA assignments for aquatic animal toxicity. Two dimensional theoretical chemical descriptors were generated for each chemical using the Toxicity Estimation Software Tool. The model was developed through augmented Markov blanket discovery from the dataset of 1098 chemicals with the MoA broad classifications as a target node. From cross validation, the overall precision for the model was 80.2%. The best precision was for the AChEI MoA (93.5%) where 257 chemicals out of 275 were correctly classified. Model precision was poorest for the reactivity MoA (48.5%) where 48 out of 99 reactive chemicals were correctly classified. Narcosis represented the largest class within the MoA dataset and had a precision and reliability of 80.0%, reflecting the global precision across all of the MoAs. False negatives for narcosis most often fell into electron transport inhibition, neurotoxicity or reactivity MoAs. False negatives for all other MoAs were most often narcosis. A probabilistic sensitivity analysis was undertaken for each MoA to examine the sensitivity to individual and multiple descriptor findings. The results show that the Markov blanket of

	a structurally complex dataset can simplify analysis and interpretation by identifying a subset of the key chemical descriptors associated with broad aquatic toxicity MoAs, and by providing a computational chemistry-based network classification model with reasonable prediction accuracy.
Database:	ScienceDirect

5	Title:	Home alone—The effects of isolation on uptake of a pharmaceutical contaminant in a social fish
	Author:	Martina Heynen, Tobias Backström, Jerker Fick, Micael Jonsson, Jonatan Klaminder, Tomas Brodin
	Journal:	Aquatic Toxicology, Volume 180, November 2016, Pages 71–77
	Abstract:	A wide range of biologically active pharmaceutical residues is present in aquatic systems worldwide. As uptake potential and the risk of effects in aquatic wildlife are directly coupled, the aim of this study was to investigate the relationships between stress by isolation, uptake and effects of the psychiatric pharmaceutical oxazepam in fish. To do this, we measured cortisol levels, behavioral stress responses, and oxazepam uptake under different stress and social conditions, in juvenile perch (Perca fluviatilis) that were either exposed (1.03 μg l−1) or not exposed to oxazepam. We found single exposed individuals to take up more oxazepam than individuals exposed in groups, likely as a result of stress caused by isolation. Furthermore, the bioconcentration factor (BCF) was significantly negatively correlated with fish weight in both social treatments. We found no effect of oxazepam exposure on body cortisol concentration or behavioral stress response. Most laboratory experiments, including standardized bioconcentration assays, are designed to minimize stress for the test organisms, however wild animals experience stress naturally. Hence, differences in stress levels between laboratory and natural environments can be one of the reasons why predictions from artificial laboratory experiments largely underestimate uptake of oxazepam, and other pharmaceuticals, in the wild.
	Database:	ScienceDirect

6	Title:	Dehydroabietic acid cytotoxicity in goldfish radial glial cells in vitro
	Author:	Lei Xing, Juan Manuel Gutierrez-Villagomez, Dillon F. Da Fonte, Maddie J. Venables, Vance L. Trudeau
	Journal:	Aquatic Toxicology, Volume 180, November 2016, Pages 78–83
	Abstract:	Dehydroabietic acid (DHAA) is a resin acid present in aquatic environments shown to induce cellular and molecular damage in aquatic animals. In this study, the cytotoxicity of DHAA on primary cultured goldfish radial glial cells (RGCs), an important component of the central nervous system, was evaluated. Here, it is reported that a concentration of 20 mg/L DHAA affected cellular morphology and expression of genes involved in RGC steroidogenesis and metabolism. Higher concentration exposures of DHAA (40 mg/L) lead to RGC death based on a lactate dehydrogenase leakage assay. Together, these data have implications in understanding the effects of DHAA on an integral central nervous system cell type important for neurogenesis, steroidogenesis and structural support. Due to

		the continuous presence of DHAA into water systems, results from this study provide indications as to the potential impacts of DHAA and demonstrate the importance of this class of chemicals on aquatic organisms.
	Database:	ScienceDirect

7	Title:	The Interplay Between Predation, Competition, and Nutrient Levels Influences the Survival of Escherichia coli in Aquatic Environments
	Author:	P. Wanjugi, G. A. Fox, V. J. Harwood
	Journal:	Microbial Ecology, October 2016, Volume 72, Issue 3, pp 526–537
	Abstract:	Nutrient levels, competition from autochthonous microorganisms, and protozoan predation may all influence survival of fecal microorganisms as they transition from the gastrointestinal tract to aquatic habitats. Although Escherichia coli is an important indicator of waterborne pathogens, the effects of environmental stressors on its survival in aquatic environments remain poorly understood. We manipulated organic nutrient, predation, and competition levels in outdoor microcosms containing natural river water, sediments, and microbial populations to determine their relative contribution to E. coli survival. The activities of predator (protozoa) and competitor (indigenous bacteria) populations were inhibited by adding cycloheximide or kanamycin. We developed a statistical model of E. coli density over time that fits with the data under all experimental conditions. Predation and competition had significant negative effects on E. coli survival, while higher nutrient levels increased survival. Among the main effects, predation accounted for the greatest variation (40 %) compared with nutrients (25 %) or competition (15 %). The highest nutrient level mitigated the effect of predation on E. coli survival. Thus, elevated organic nutrients may disproportionately enhance the survival of E. coli, and potentially that of other enteric bacteria, in aquatic habitats.
	Database:	SpringerLink

8	Title:	Microbial Community and Greenhouse Gas Fluxes from Abandoned Rice Paddies with Different
	Author:	Sunghyun Kim, Seunghoon Lee, Melissa McCormick, Jae Geun Kim, Hojeong Kang
	Journal:	Microbial Ecology, October 2016, Volume 72, Issue 3, pp 692–703
	Abstract:	The area of rice paddy fields has declined continuously in East Asian countries due to abandonment of agriculture and concurrent socioeconomic changes. When they are abandoned, rice paddy fields generally transform into wetlands by natural succession. While previous studies have mainly focused on vegetation shifts in abandoned rice paddies, little information is available about how these changes may affect their contribution to wetland functions. As newly abandoned fields proceed through succession, their hydrology and plant communities often change. Moreover, the relationships between these changes, soil microbial characteristics, and emissions of greenhouse gasses are poorly

	understood. In this study, we examined changes over the course of secondary succession of abandoned rice paddies to wetlands and investigated their ecological functions through changes in greenhouse gas fluxes and microbial characteristics. We collected gas and soil samples in summer and winter from areas dominated by Cyperaceae, Phragmites, and Sphagnum in each site. We found that CO2 emissions in summer were significantly higher than those in winter, but CH4 and N2O emission fluxes were consistently at very low levels and were similar among seasons and locations, due to their low nutrient conditions. These results suggest that microbial activity and abundance increased in summer. Greenhouse gas flux, soil properties, and microbial abundance were not affected by plant species, although the microbial community composition was changed by plant species. This information adds to our basic understanding of the contribution of wetlands that are transformed from abandoned rice paddy systems.
Database:	SpringerLink

9	Title:	Key aspects of the biology, fisheries and management of Coral grouper
	Author:	Ashley J. Frisch, Darren S. Cameron, Morgan S. Pratchett, David H. Williamson, Ashley J. Williams, Adam D. Reynolds, Andrew S. Hoey, Justin R. Rizzari, Louisa Evans, Brigid Kerrigan, Geoffrey Muldoon, David J. Welch, Jean-Paul A. Hobbs
	Journal:	Reviews in Fish Biology and Fisheries, September 2016, Volume 26, Issue 3, pp 303–325
	Abstract:	Coral grouper (genus Plectropomus), or coral trout, are members of the grouper family (Epinephelidae) and are one of the largest and most conspicuous predatory fishes on Indo-Pacific coral reefs. They are highly-prized food fishes that are targeted by subsistence, artisanal, commercial and recreational fisheries throughout their geographic range. Plectropomus have broadly similar diets and habitat requirements to other tropical groupers, but typically have faster growth and higher natural mortality rates. Although these characteristics are expected to increase population turnover and reduce innate vulnerability to environmental and anthropogenic impacts relative to other groupers, many Plectropomus populations are in decline due to the combined effects of overfishing and habitat degradation. In many locations, stock depletion from uncontrolled fishing, particularly at spawning aggregation sites, has resulted in local fishery collapse. Therefore, improved management of wild populations is urgently required to ensure conservation and sustainable fisheries of Plectropomus. Where possible, a combination of no-take marine reserves, market-based management approaches, and allocation or resurrection of property rights systems are recommended to complement conventional fishery management actions that limit catch and effort. Additional investment in aquaculture propagation is also needed to reduce fishing pressure on wild stocks and support management initiatives. This global synthesis of information pertaining to the biology, fisheries and

	management of Plectropomus will assist in guiding future management actions that are attempting to address a range of stressors including fishing, reef habitat degradation, and the escalating effects of climate change.
Database:	SpringerLink

10	Title:	Influence of geographic setting on thermal discharge from coastal power plants
	Author:	Hou-lei Jia, Shu Zheng, Jian Xie, Xiao-ming Ying, Cui-ping Zhang
	Journal:	Marine Pollution Bulletin, Volume 111, Issues 1–2, 15 October 2016, Pages 106–114
	Abstract:	Characteristics of thermal discharge from three coastal power plants were studied in China. The three plants, Zhuhai Power Plant, Chaozhou Power Plant and Huilai Power Plant, are located in estuary, bay and open sea, respectively. The water temperatures and ocean currents surrounding the outlet of the three power plants were monitored. The results show that the temperature rise became smaller as the spread of thermal discharge moved toward the open sea, which confirms the results of previous studies. The results also indicated that the influence range of thermal discharge from a coastal power plant is determined by geographic setting. The temperature rise range of the Chaozhou Plant, which is located in a bay, was the largest, followed by that of the Zhuhai Plant located in an estuary, and the temperature rise range of the Huilai Plant located in an open sea was the smallest.
	Database:	ScienceDirect