model algorithm has made it possible to run the simulations efficiently and examine chemical exposure at a detailed spatial scale over a large geography (river basins or U.S.). Model simulation results are accessible to users in tabular (MS Excel) and spatial (MS Access) data formats for easy interpretation and further customization. A case study comparing prior version of the model and latest iSTREEM® 2.0 for the U.S will be presented to examine the impact of recent upgrades to model results – with focus on the national distribution of flows (mean and 7Q10's), effluent PEC's, water use, dilution factors, and receiving surface water PEC's. The developments to iSTREEM® improves its utility as a tool to support environmental exposure assessments by a variety of users for environmental risk assessments across multiple commodity groups (personal care products, pharmaceuticals, food additives, pesticides, etc.).

514 Impacts of Hydroelectric Power Expansion on Methylmercury Exposures of Northern Indigenous Communities

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Renewable energy plans across North America depend on untapped hydroelectric resources across Northern Canada. Hydroelectric reservoirs accelerate production of methylmercury (MeHg) resulting in enhanced accumulation in fish and wildlife and pose risks to indigenous populations that rely on local foods. The magnitude of MeHg increases in local food webs is affected by the quality and quantity of organic carbon in the flooded reservoir. We use soil organic carbon data and the watershed characteristics of planned hydroelectric development areas across the Canadian North to develop a screening model for peak MeHg increases expected in each system. Over 90% of new capacity impacts the traditional hunting environments of local indigenous populations. We use extensive biogeochemical data from the region surrounding the Lower Churchill River in Labrador, Canada and human exposure information from three local Inuit communities to quantify increase in MeHg exposure due to flooding associated with hydroelectric facilities. More than half of the total exposure increases among this population are expected to fall on individuals who are in the top 10% of exposure levels prior to flooding. Among the Labrador Inuit, hydroelectric development is expected to roughly double the number of individuals exceeding EPA and Health Canada reference doses for MeHg. However, there may be as few as 20% more individuals exceeding these thresholds if topsoil is removed, as this is the main reservoir of labile organic carbon.

515 Assessing Exposure and Ecotoxicological Impacts in the State of Qatar

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Exposure science and ecological risk assessment continues to develop and evolve in the State of Qatar. Efforts have been taken to utilize appropriate tools and methodologies developed in North America, Europe as well as other relevant hot and arid countries. In many cases, however, the extreme environmental conditions (e.g., high water temperature and salinity) and differing ecosystem structures (e.g., warm water species such as corals) require adaptation of the typical approaches and tools. At EMRQ we are developing an integrated approach to assess discharges, fate, exposure and ecotoxicological impacts in the marine environment. Our initial focus is on the Liquefied Natural Gas (LNG) industry which is important to Qatar and other global regions; and increasingly so for North America, both in the United States and Canada. We have worked closely with our industry partners to robustly quantify discharges and model transport/fate using a spatially and temporally resolved hydrodynamic model combined with laboratory-based data. We also incorporate measured field data for evaluation of these tools and to assess ecological impacts. In the laboratory we have developed ecotoxicology protocols for reference species applicable to Qatari waters as well as dose-response relationships across various trophic levels and key contaminants. Current efforts include the continued development and application of an EcoRisk modeling framework which ties together these multiple components and environmental stressors into a tool that can be used by industry and government to assess ecological risk related to current discharge and exposure scenarios and also for future predictive and planning purposes. This presentation will include recent updates to the modeling framework and application to an environmentally-relevant case study.

516 Assessing the influence of secondary organic versus primary carbonaceous aerosols on long-range atmospheric PAH transport

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We use the chemical transport model GEOS-Chem to evaluate the hypothesis that atmospheric polycyclic aromatic hydrocarbons (PAHs) are trapped in secondary organic aerosol (SOA) as it forms. Trapping of PAHs in SOA would prevent evaporation to the gas phase and protect PAHs from degradation; this could potentially explain why model-estimated PAH particulate fractions are frequently lower than those observed in the atmosphere. We test the ability of three different partitioning configurations within the model to reproduce observed total concentrations in the midlatitudes and the Arctic as well as midlatitude gas–particle phase distributions. The configurations tested are (1) the GEOS-Chem default configuration, which uses instantaneous equilibrium partitioning to divide PAHs among the gas phase, a primary organic matter (OM) phase (absorptive), and a black carbon (BC) phase (adsorptive), (2) an SOA configuration in which PAHs are trapped in SOA when emitted and slowly evaporate from SOA thereafter, and (3) a configuration in which PAHs are trapped in primary OM/BC upon emission and subsequently slowly evaporate. We also test the influence of changing the fraction of PAHs available for particle-phase oxidation. Trapping PAHs in SOA upon formation and protecting against particle-phase oxidation (configuration 2) better matches observed remote concentrations compared to our default configuration (configuration 1). However, we find that simulating adsorptive partitioning to BC is necessary to reproduce the magnitude and seasonal pattern of gas–particle phase distributions. Thus, the last configuration (configuration 3) results in the best agreement between observed and simulated concentration/phase distribution data. The importance of BC rather than SOA to PAH transport is consistent with strong observational evidence that PAHs and BC are co-emitted.

517 Sorptive capacities of leaves for organic pollutants measured using passive dosing: Lipid characterization and passive dosing experiments

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Leaves play an important role in the cycling of semi-volatile organic pollutants as a result of their large surface area and lipid-rich cuticle. Semi-volatile pollutants that are scavenged from the atmosphere by leaves can be transferred to the soil through the shedding of waxes and litter (Horstmann and McLachlan 1998), where they will either be trapped or re-released to the atmosphere upon decomposition of the plant material. Most multimedia chemical fate models use either an octanol-equivalent model for leaves (e.g., BETR, MacLeod et al. 2011) or reported values from the literature for specific species under the assumption that all plant species have the same sorptive capacity (e.g., CoZMo-POP, Wania et al. 2006). It has been shown, however, that the sorptive capacities of different plant species can vary considerably (Kömp and McLachlan 1997). In this study we modified an existing passive dosing system to measure the sorptive capacities of the solvent extractable organic matter (EOM) of a wide variety of leaves including; Norway spruce, douglas fir, red oak, common reed, European beech, rhododendron and European alder. Lipids present in the EOM were characterized by ^{1}H-NMR spectroscopy in combination with LC-MS and LC-ELSD. While the previous passive