conducted on Lake Maggiore (northern Italy)

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The causes and origin of foams in lakes have been rarely object of studies, although this phenomenon may cause problems to touristic or fisheries activities and imply a possible risk to human health. The formation of foams in the aquatic environment is due to the accumulation of surface-active compounds (surfactants) at the air-water interface joined with the mechanic action of a forcing (such as wind or waves) able to inject gas bubbles in the upper water layer. Surfactants can be either of natural or synthetic origin. Fulvic or humic acids, lipidic, proteic or colloidal substances are examples of natural surfactants that can promote foam formation, while man-made foams are generally due to the release of phosphates from agriculture and/or to the presence of organic and inorganic detergents. A comprehensive analysis of three foam episodes in Lake Maggiore (2007, 2008 and 2010) has been undertaken to identify their origin, causes and to unravel most likely factors triggering foam formation. At this scope, a long term (2000-2013) analysis of phytoplankton biovolumes and meteorological and hydrological anomalies has been performed together with the chemical characterization of foams. Foam resulted of endogenous origin, related to phytoplankton biomass degradation. The long term analysis highlighted atypical warm temperatures and residual lake stratification in winter in two of the years of foam events, coupled with exceptional Bacillariophyceae blooms in spring. *Tabellaria flocculosa* mostly contributed in terms of biomass in 2007 and 2008, but not in 2010, and overall total algal biomass seemed a better predictor of the risk of foam formation. Foam events occurred from July to December, driven by atypically high windy conditions, and congruently with the time needed to degrade biomass into surfactant compounds. A co-occurrence of different factors resulted essential to generate foams, and climate changes likely contributed to enhance their occurrence in Lake Maggiore.