**Characterizing pesticide irrigation and storm runoff from agricultural fields in the Central Coast of California**

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In the Central Coast of California (CCC), the majority of agricultural pesticide applications occur from April to October. While pesticide runoff from agricultural fields has been regularly monitored and well documented by state and federal agencies during the summer months, it has not been well characterized during the winter season when fewer pesticides are applied. The timing of peak pesticide concentrations in runoff does not necessarily coincide with seasonal pesticide application patterns, especially in California, where rainfall events occur more frequently in the winter months. Therefore, storm runoff has the potential to rapidly transport a greater mass of residual pesticides from the site of application to adjacent waterways. Here, comparative analyses were conducted from agricultural runoff collected in the CCC to better understand: (1) differences in pesticide detection frequencies (DF) and concentrations between non-storm (i.e., irrigation) and storm events; and (2) the potential for seasonal toxicity via aquatic life benchmark exceedances (BE).

Ambient surface water monitoring was conducted at six long-term sites in Monterey County from 2019 to 2021. Six non-storm events and three storm events were monitored during the growing season. A total of 67 pesticides (including seven pyrethroids and five neonicotinoids) were analyzed for each water sample. Preliminary analyses suggest that significantly more pesticide residues were detected in storm events (p < 0.0001) when compared to non-storm events. For hydrophobic active ingredients (AIs) such as pyrethroids, both DF and BE were significantly higher during storm events than non-storm events. In contrast, for hydrophilic AIs such as neonicotinoids, DF and BE were not significantly different between storm and non-storm events. The results indicate that pesticide DF, BE and concentrations in storm runoff were associated with pesticide physical-chemical properties (e.g., Kow, Koc) and runoff-generating storm events.