

# The Impact of the Global Economic Crisis of 2008 – 2009 on $PM_{2.5}$ across Southern Ontario

*plus a technique for including measurement error in tests of statistical significance*

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Hourly measurements of particulate matter smaller than  $2.5 \mu\text{m}$  in diameter ( $PM_{2.5}$ ) made across Ontario between 2003 and 2010 were examined in an attempt to identify whether significant reductions occurred during the *global economic crisis*. All sites considered experienced reductions of  $5$  to  $10 \mu\text{g m}^{-3}$  (25% to 50%) in monthly-mean  $PM_{2.5}$  during spring and summer 2009 for south and west winds. These were significant at the 95% confidence level; even when measurement random error was assumed to be 50%. While the magnitude of reductions for north and east winds were less, reductions for many months were still significant at the 95% confidence level.

With Lake Ontario situated immediately east of Burlington and Hamilton, differencing their  $PM_{2.5}$  values made it possible to isolate, during east wind conditions,  $PM_{2.5}$  due to emissions from the heavy industrial sector located in the northeast corner of Hamilton. Their contribution increases Hamilton's  $PM_{2.5}$  by 2 to 3 times over that of the air coming off Lake Ontario. During spring 2009 the contribution from heavy industry was reduced significantly by ~50%. This is consistent with a known closure and attenuated production of steel at Hamilton's mills.



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