

Posting type	Advisory
Subject	Diminished wintertime nitrate concentrations in late 1990s
Module/Species	B/ NO ₃ ⁻
Sites	Sites throughout entire network; not observed at all sites
Period	Wintertime, 1996-1997 through 1999-2000
Recommendation	Use wintertime nitrate data from this period with caution. Concentrations at many sites appear to be anomalously low
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Note: This replace the advisory “[A Discontinuity in the Nitrate Ion Time Series at June 1996](#)”

Supporting information

Wintertime nitrate concentrations at many IMPROVE sites were below historical levels for about four years, from 1996-97 to 1999-2000. Figure 1 presents an example time series from Mammoth Cave, KY. Wintertime IMPROVE nitrate concentrations have been at consistent levels since 2000-2001, and these levels are comparable to those observed prior to 1996-97. Current levels are also comparable to those measured independently in STN and CASTNet.

Special sensitivity experiments indicate that changes in filter size and manufacturing lot during 2000 should not have been responsible for the increases in nitrate concentration that were observed in the following winter. Filters were not available for comparable tests of the filter lots used in the 1990s. Extensive denuder tests also indicate that minor changes in denuder preparation implemented in 1996 were not responsible for the drop in nitrate concentrations that occurred in the following winter.

Our inability, after experimentation and testing, to identify any methodological cause for the below-normal winter nitrate concentrations leads us to the following conclusions:

- IMPROVE nitrate data collected since mid-2000 are valid and accurate. These data can be used with confidence in data analysis.
- IMPROVE nitrate data collected prior to mid-1996 are also likely to be valid and accurate. However, we cannot state so with the same level of confidence as we can for recent data since we do not have nylon filters to test from that period.
- IMPROVE wintertime nitrate concentrations at some sites from 1996-97 to 1999-2000 appear to be anomalously low. We recommend treating these data with caution, although

we have no evidence to declare these data invalid. As with the earlier period, we do not have filters to test.

