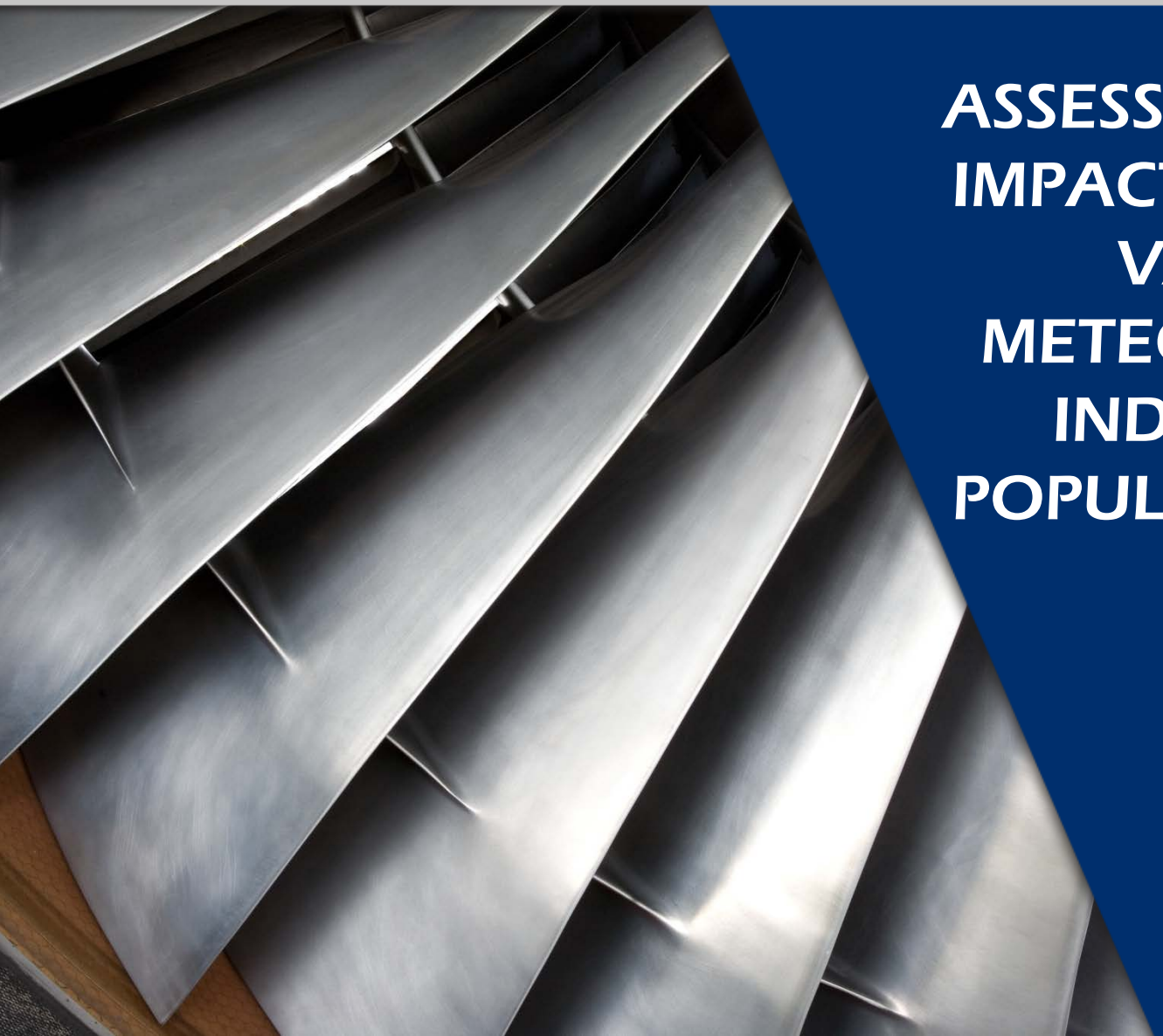
ABS Consulting

AN ABS GROUP COMPANY



ASSESSMENT OF THE IMPACT OF ANNUAL VARIATIONS IN METEOROLOGY ON INDIVIDUAL AND POPULATION DOSES

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REEW WORKSHOP

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WHO IS ABS?

- ABS Group of Companies (American Bureau of Shipping).
- ABS – More than 2,300 employees in 80 offices in 35 countries, world wide.
- Primary business is the inspection of large ships for insurance companies.
- ABS Consulting deals in the evaluation of risk (PRAs).
- Meteorological data is used in risk analysis.

METEOROLOGY

- ABS Consulting – More than 40 years of collecting meteorological data at US nuclear power plants.
- Have collected and reviewed data at more than 20 of the operating plants in the US.
- Experts in meteorological data review.
- For this study we have used data from 3 plants in different regions of the US.
- At least 10 years of data from each plant was evaluated.

WHAT WILL I BE TALKING ABOUT?

- When most of the current operating plants were licensed the meteorological data was suspect.
- Many plants ODCM contain X/Q and D/Qs that used data from the licensing period.
- The quality of meteorological data has greatly improved in recent years.
- Achieving the required 90% data recovery is no longer a problem at most plants.
- It is time for all plants to update their X/Q and D/Q with more recent data.
- How many years of meteorological data should be used?

WHAT WILL I BE TALKING ABOUT

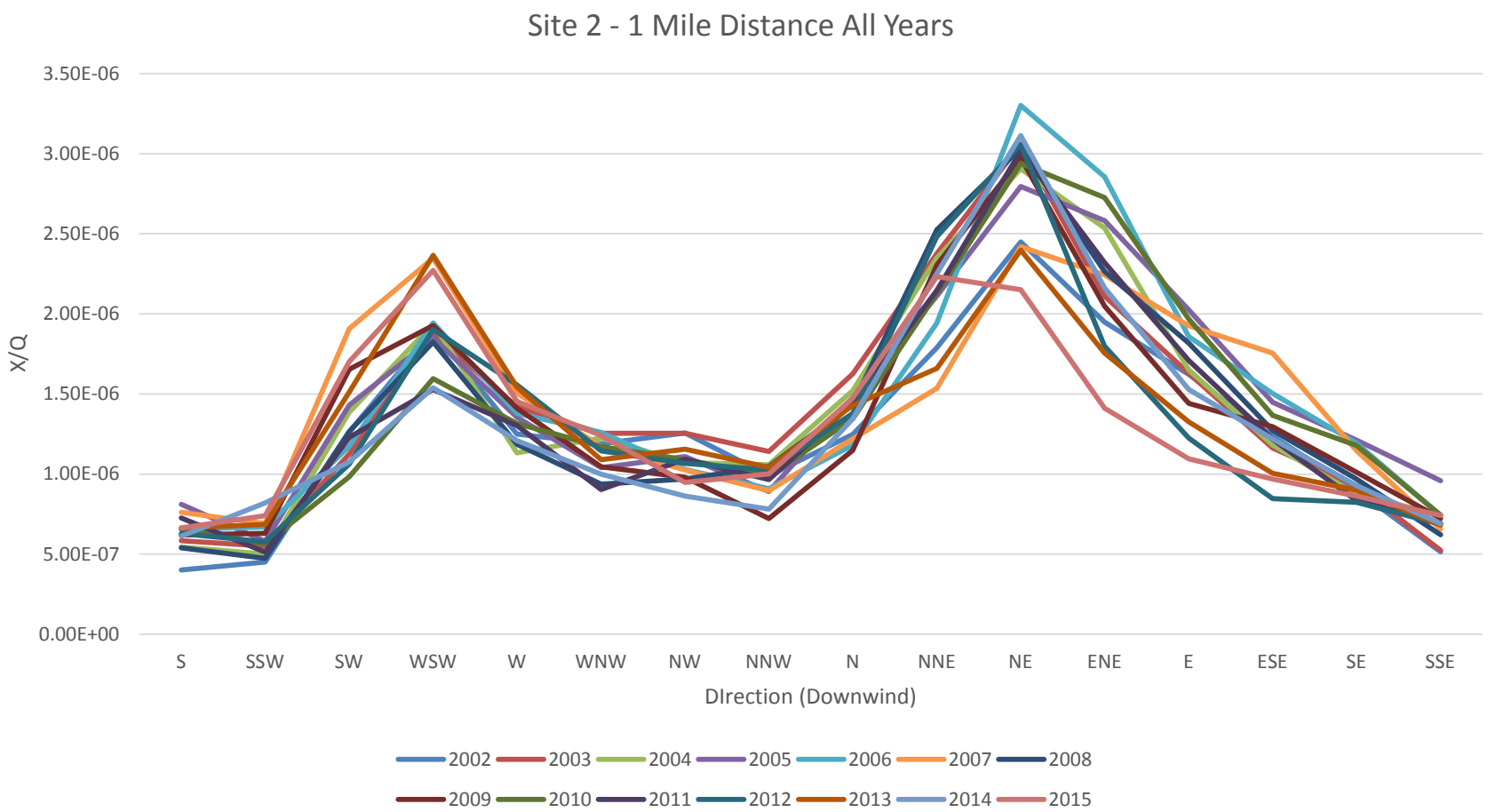
- Should I be using something like XOQDOQ that uses joint frequency distribution data in wind speed and stability groups or should I be using my hourly meteorological data?
- How do I know what years of data to use and has the data been reviewed by someone knowledgeable with my site and the local region?
- Have there been any changes in receptor locations since I last ran my X/Q and D/Qs?
- How many years of data do I need to run in order to get a good average for my region?
- Do I need to use terrain recirculation factors in my calculations?

WHAT QUESTIONS WILL I TRY TO ANSWER?

- The differences between annual data sets at given locations in using average X/Q at each grid location.
- The differences between annual data sets when examining the dose at given locations in the population grid using hourly meteorological data.
- The differences between annual data sets when examining total population dose using average X/Q values.

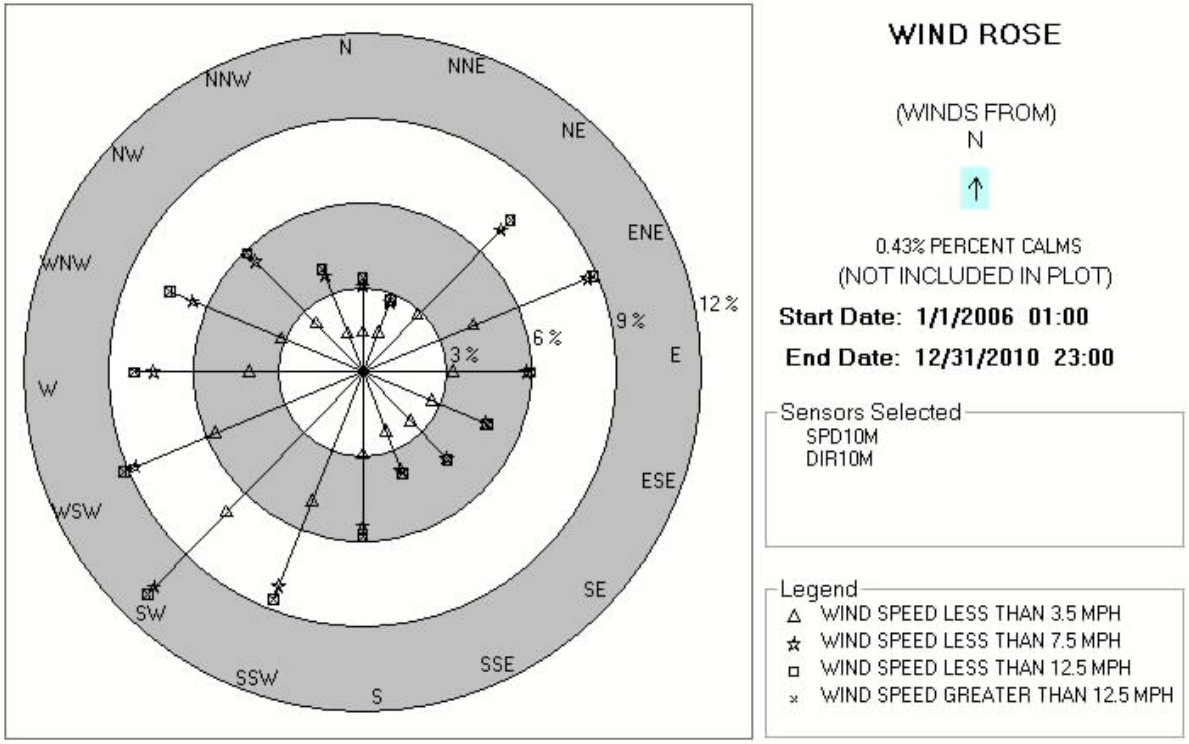
- The differences between annual data sets when examining total population dose using hourly meteorological data.
- The differences between total population doses using average X/Q versus hourly meteorological data for the same years.
- The effects of using actual population data rather than an average population density on the variations of total population dose.

X/Q VALUE COMPARISON FOR ALL YEARS

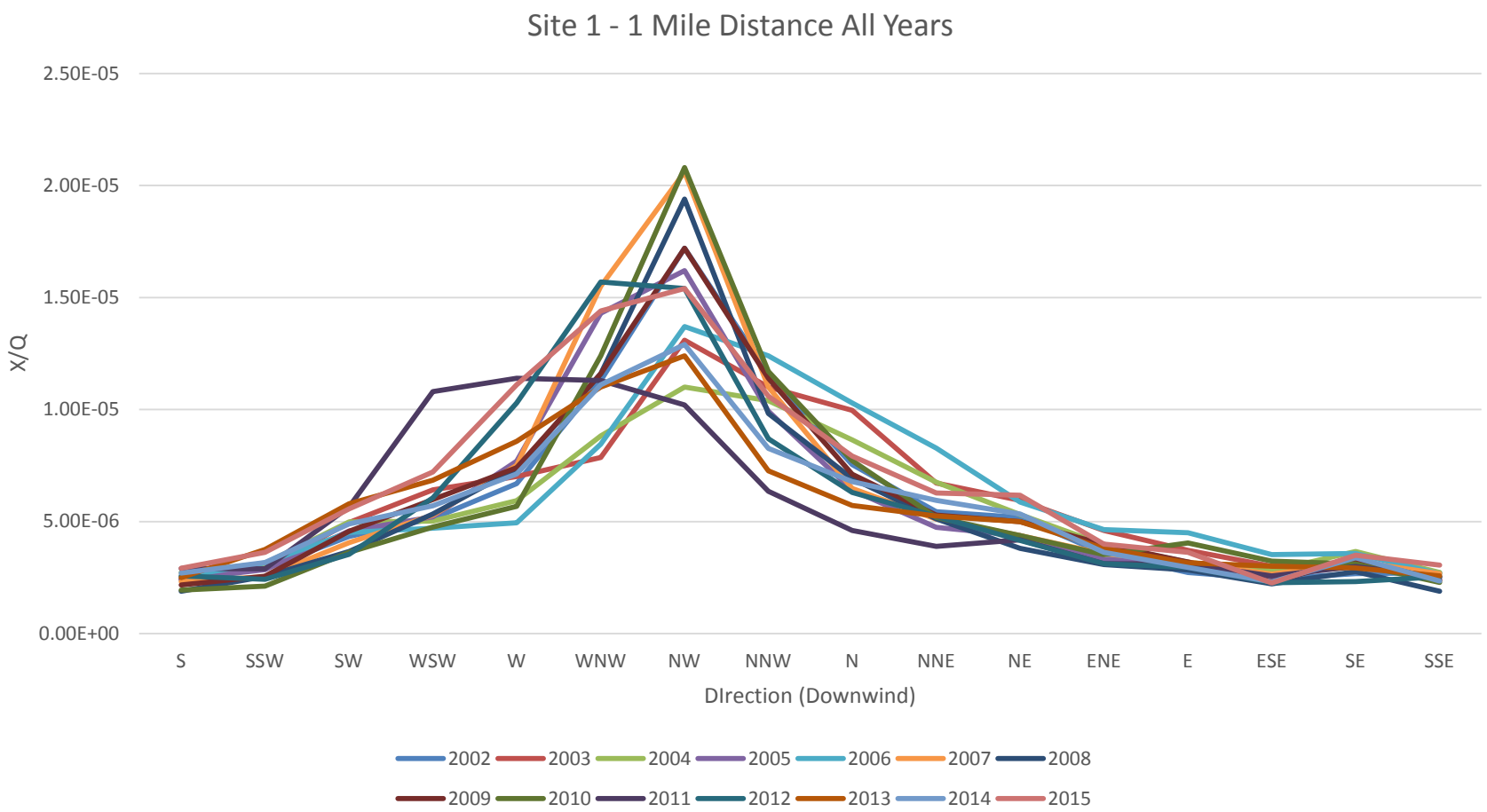


5-YR WIND ROSE

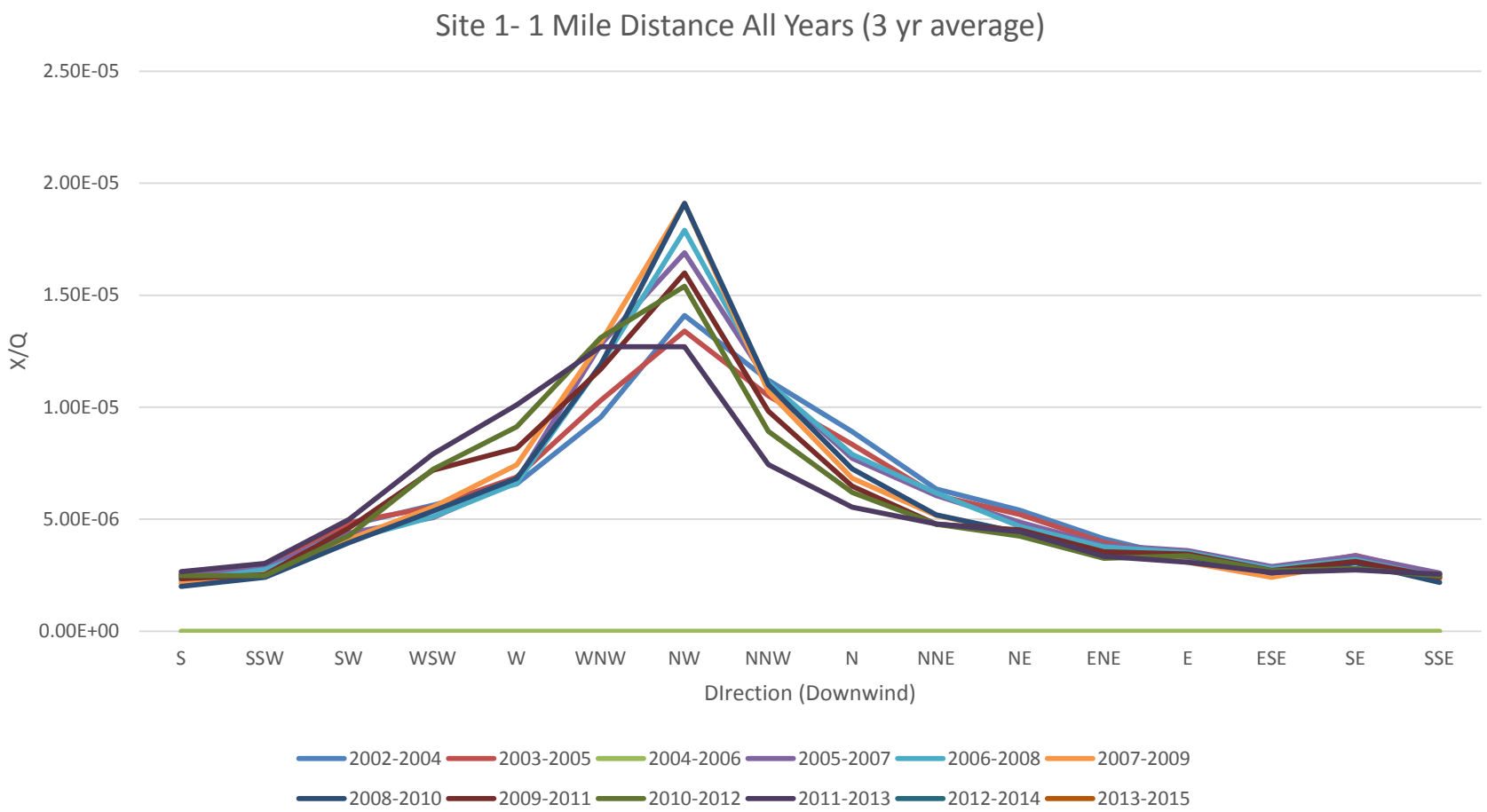
- PRIMARY SECTORS ARE FROM THE SOUTHWEST AND EAST-NORTHEAST



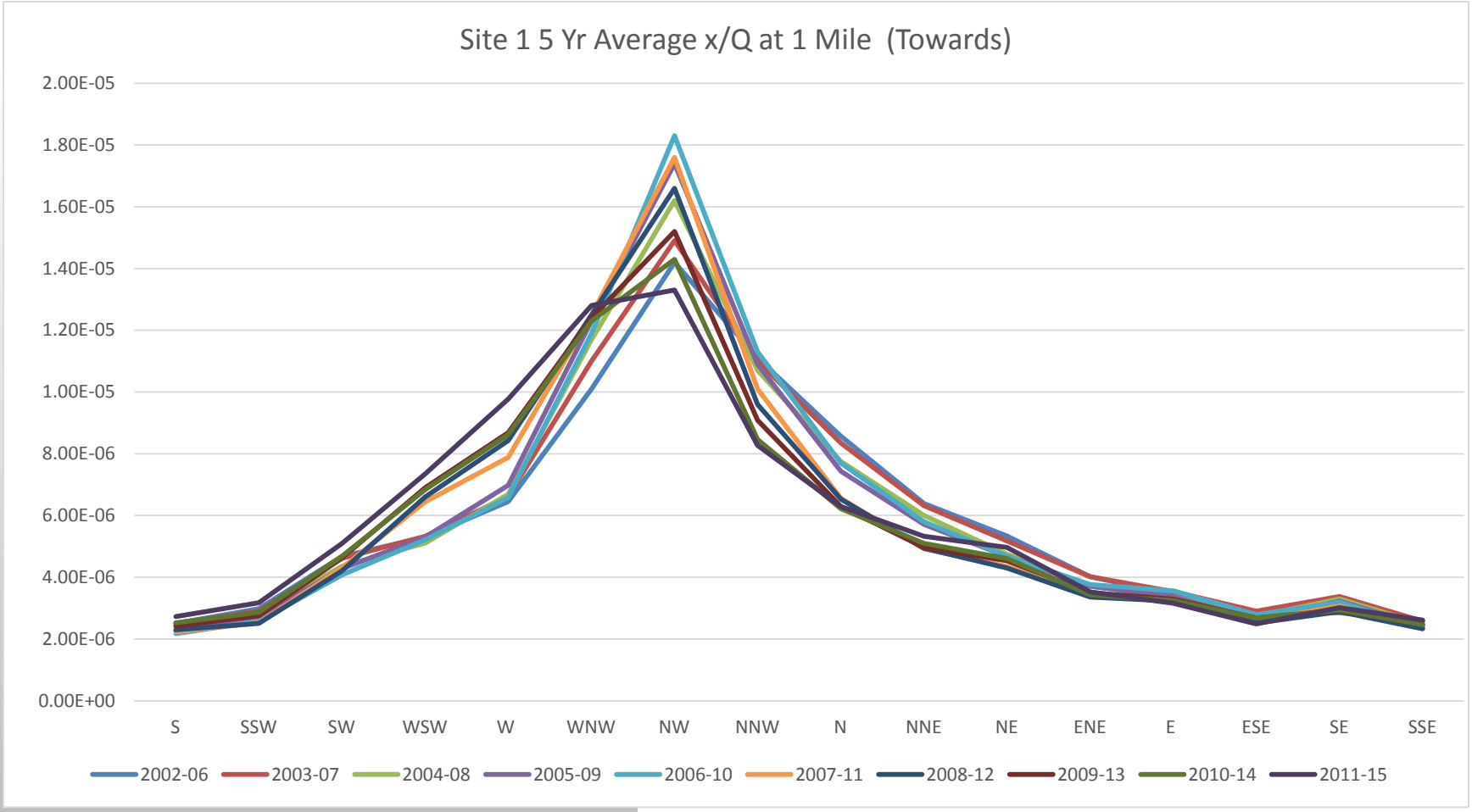
YEAR TO YEAR VARIATION



3-YEAR AVERAGES WITH LESS VARIATION



5-YR AVERAGES WITH EVEN LESS VARIATION



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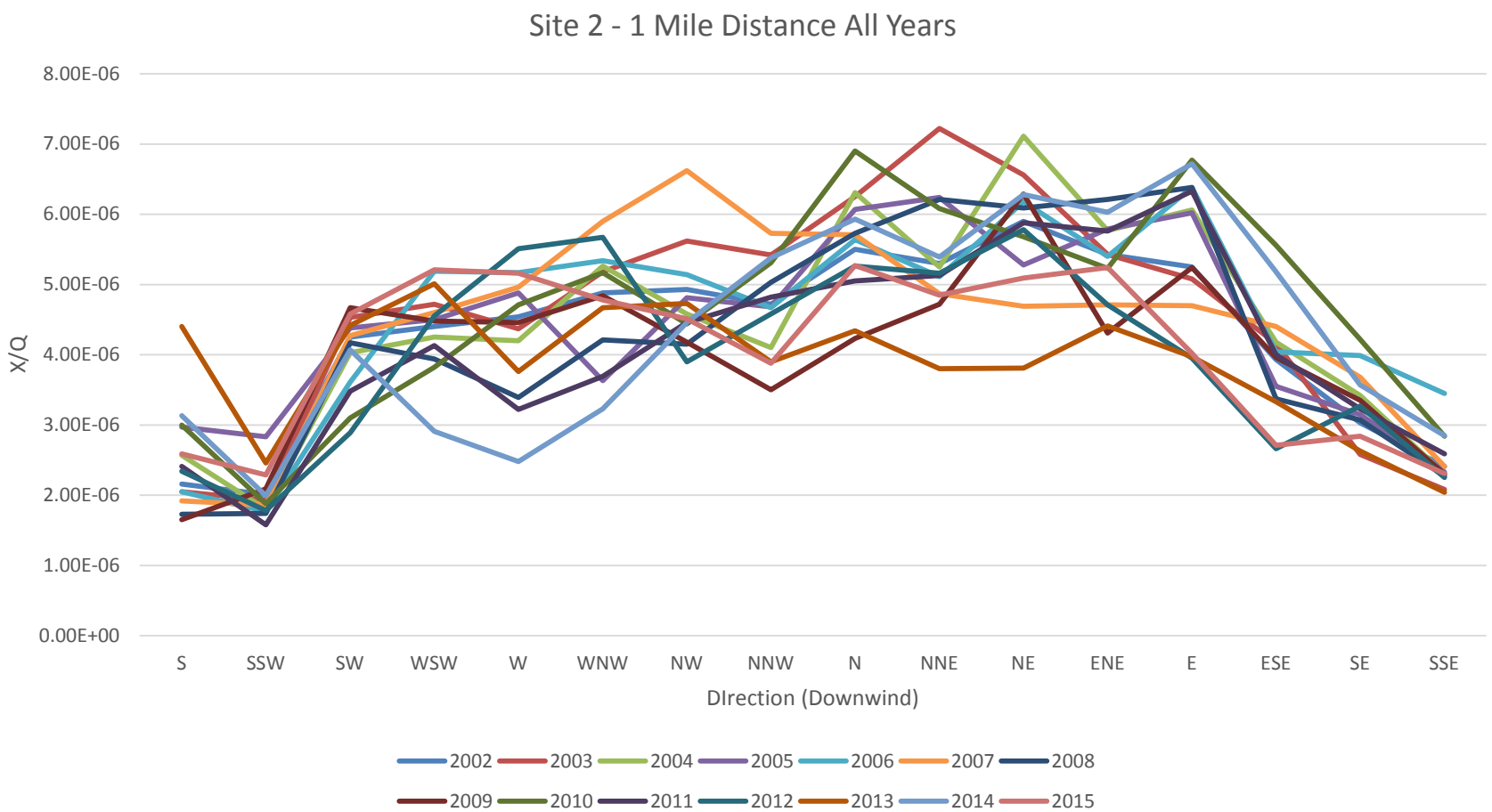

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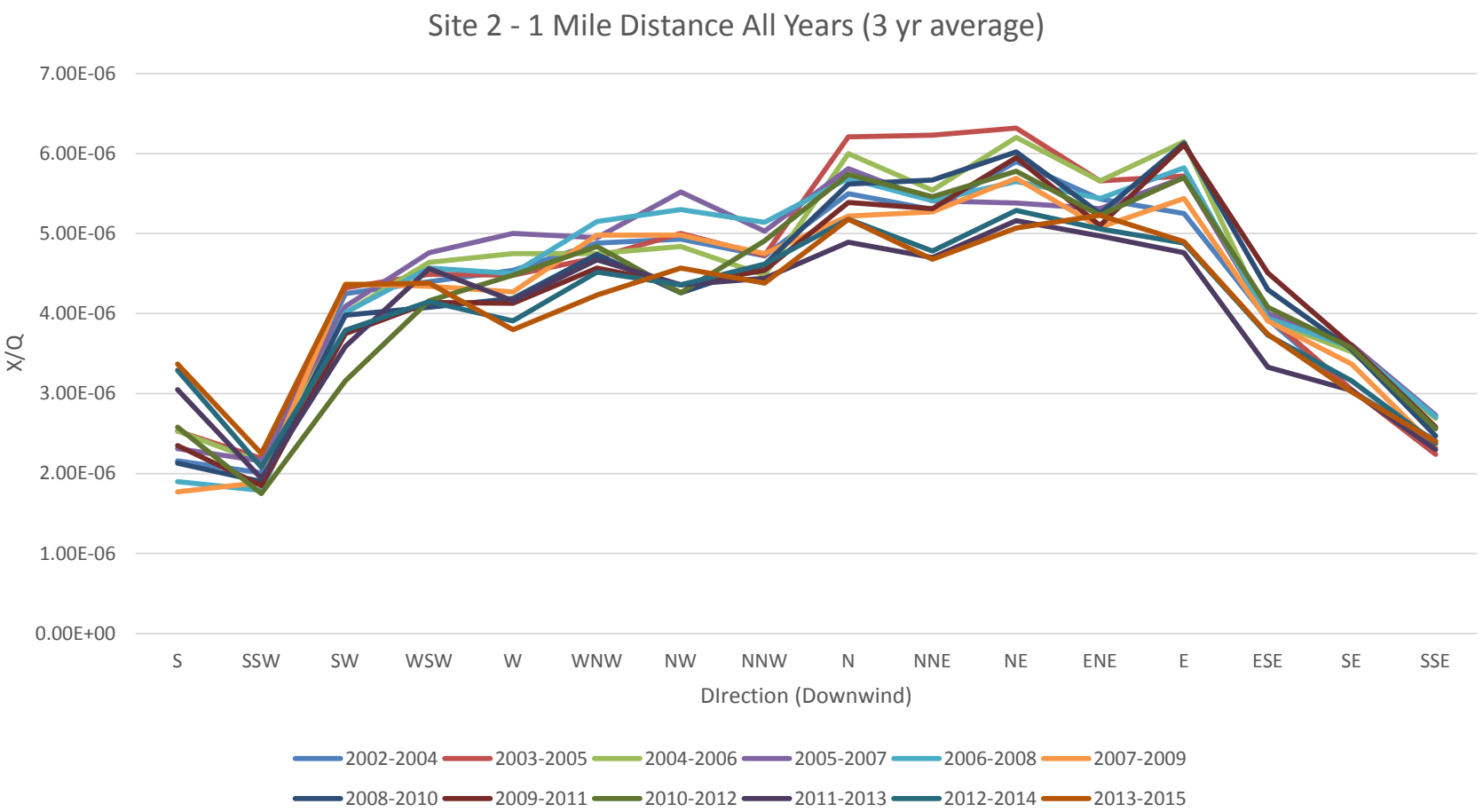

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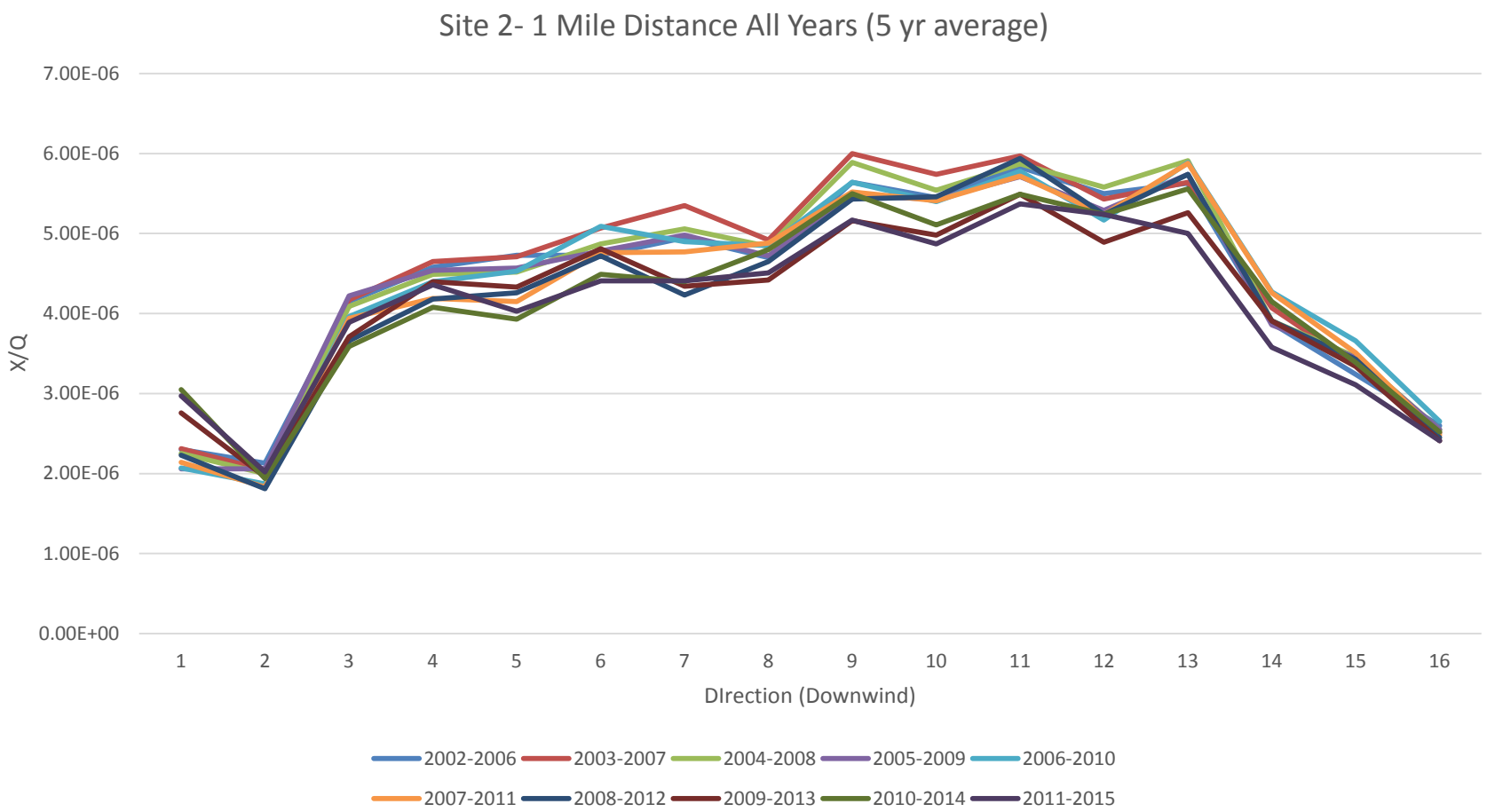
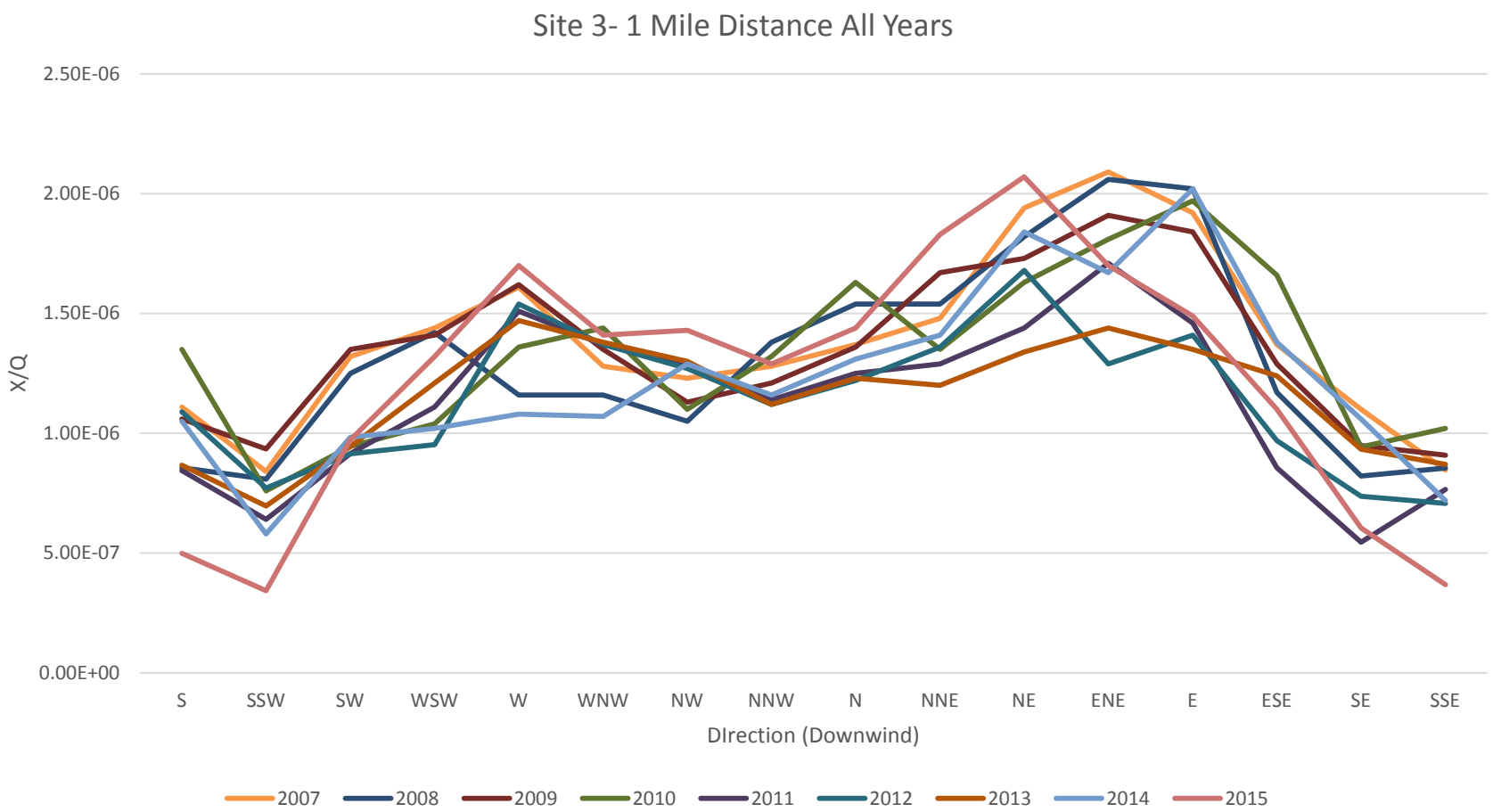
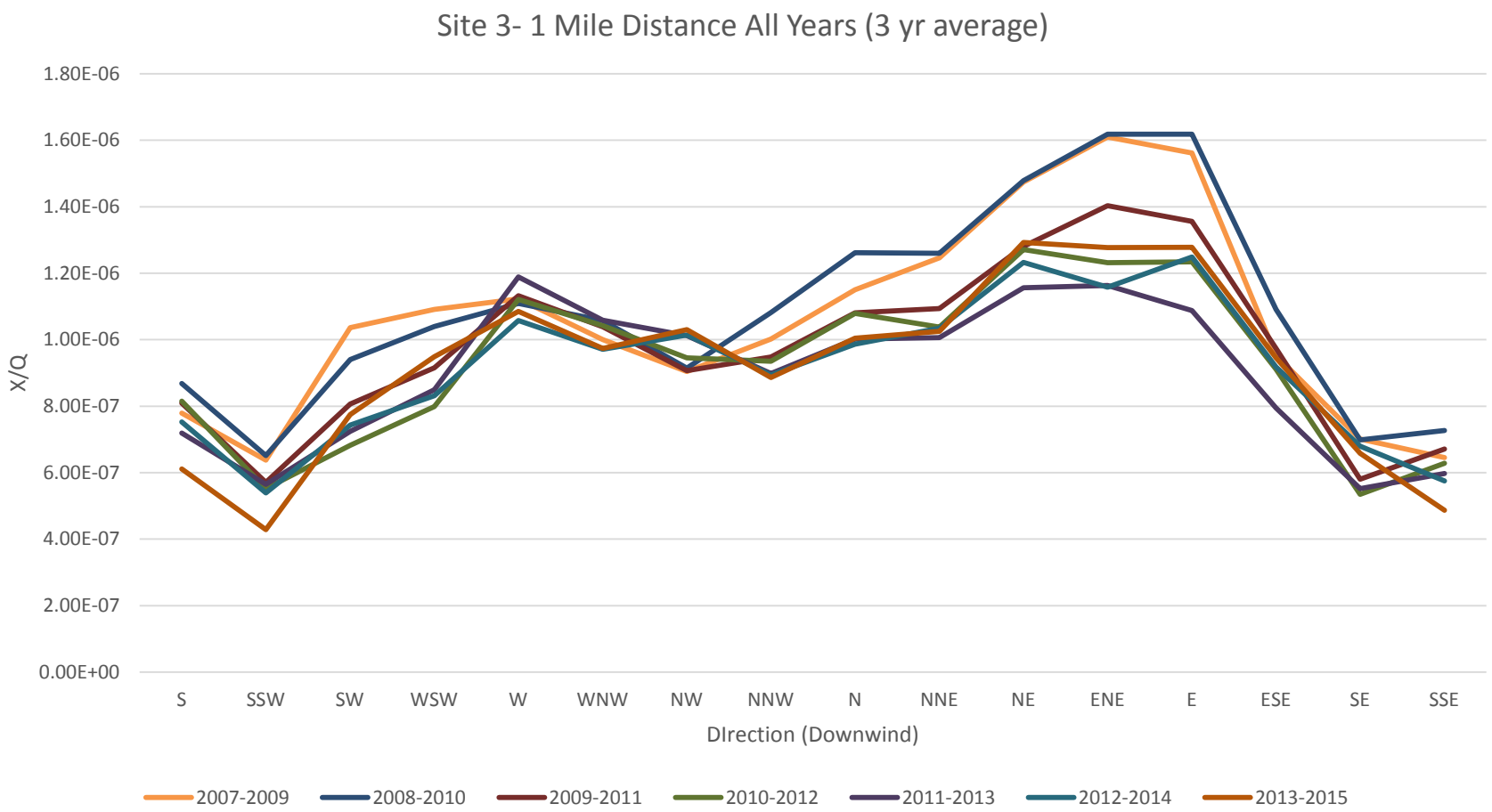


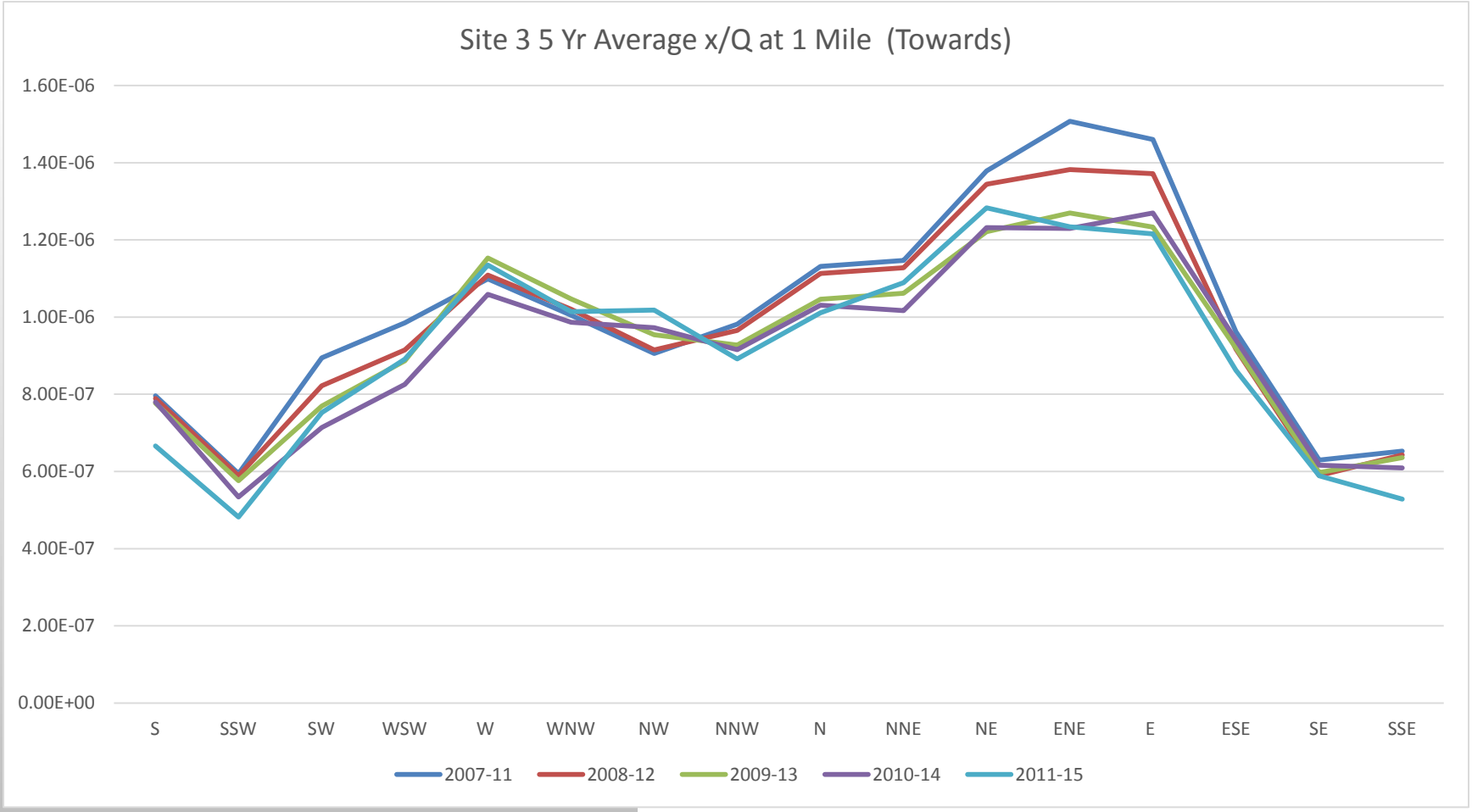
YEAR-TO-YEAR VARIATION



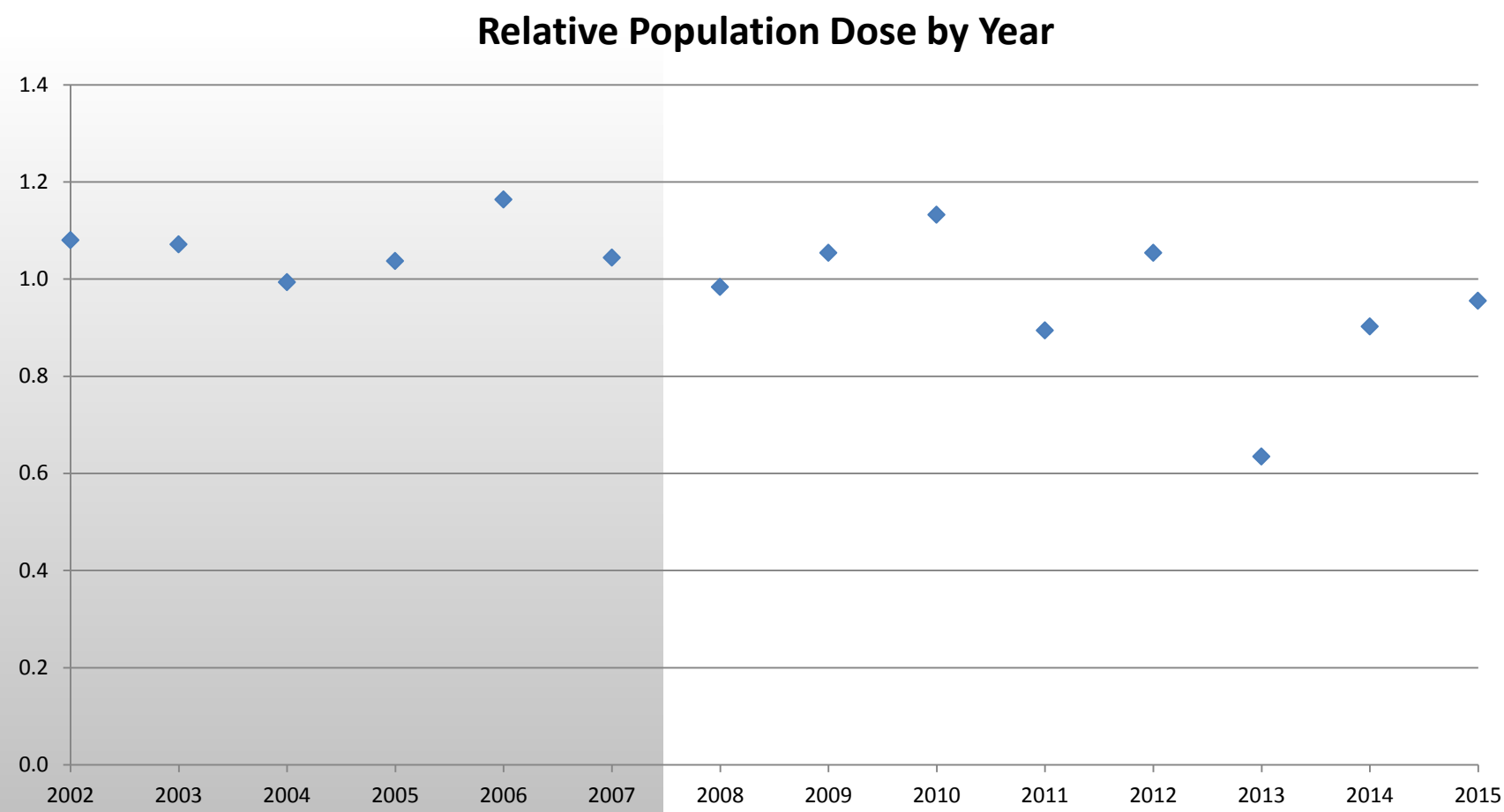
3-YR AVERAGES LOOKING BETTER



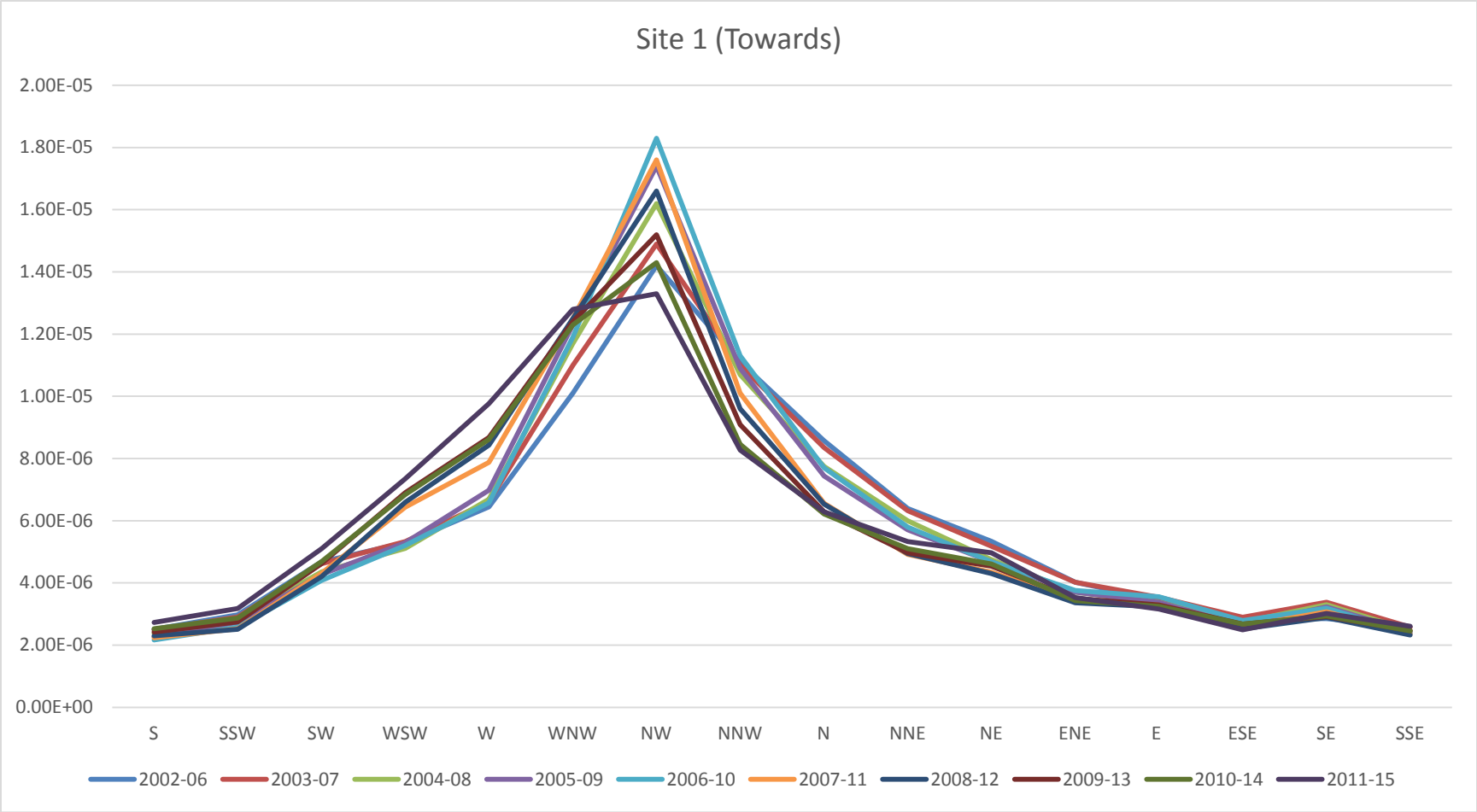
5-YR AVERAGES WITH EVEN LESS VARIATION



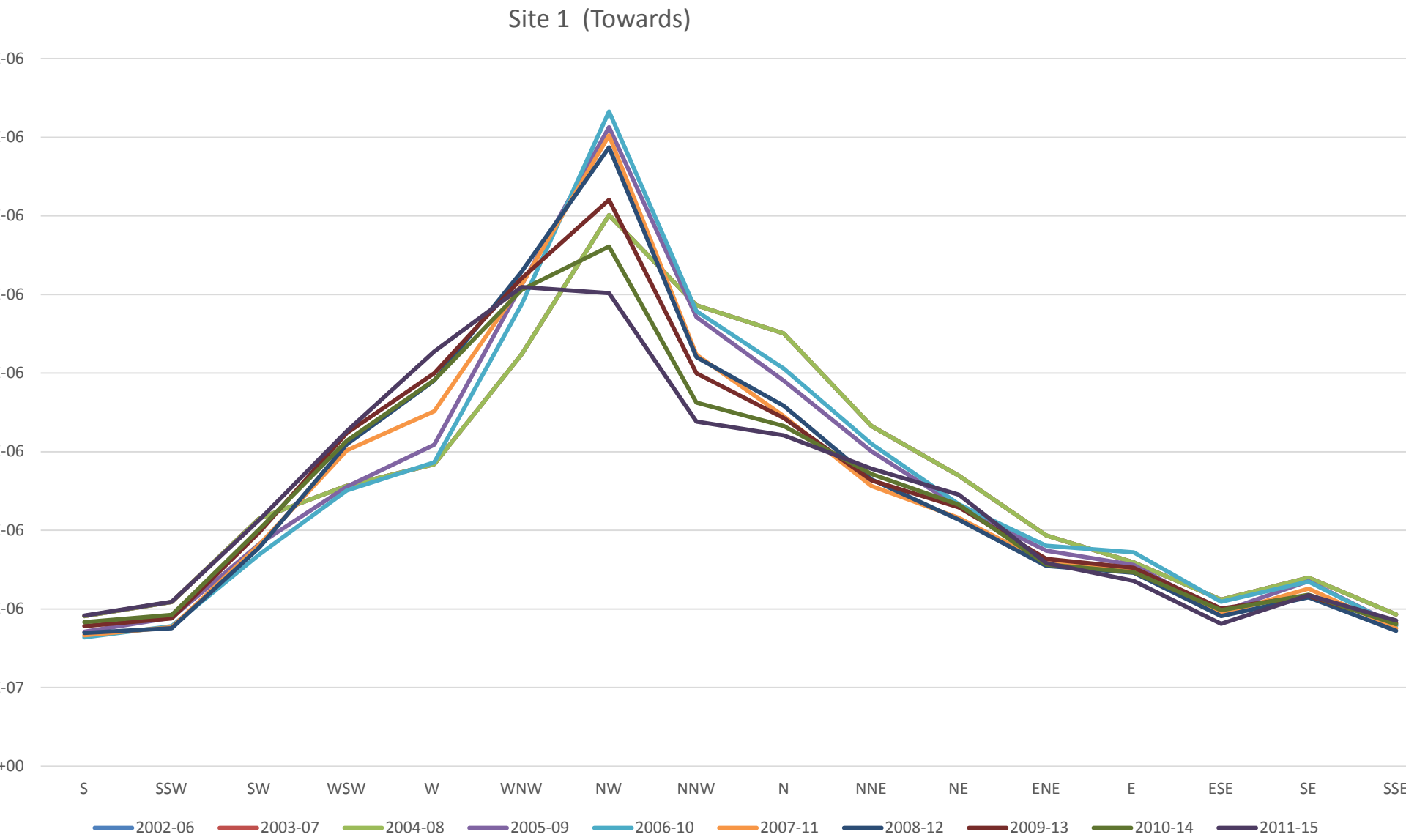
VARIATION IN RELATIVE DOSE BY YEAR



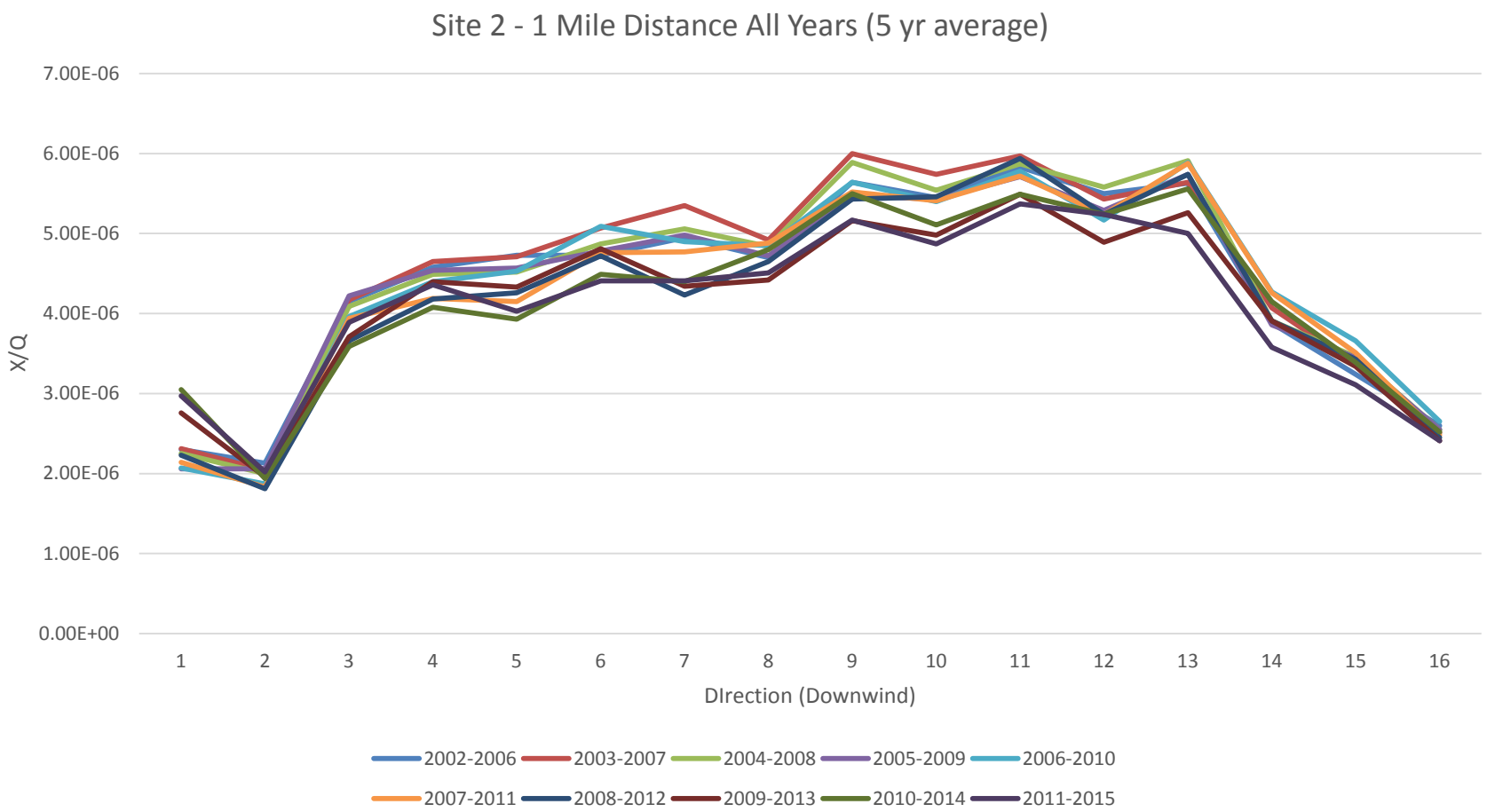
5-YR AVERAGES OF X/Q VALUES AT ONE MILE USING HOURLY MET DATA



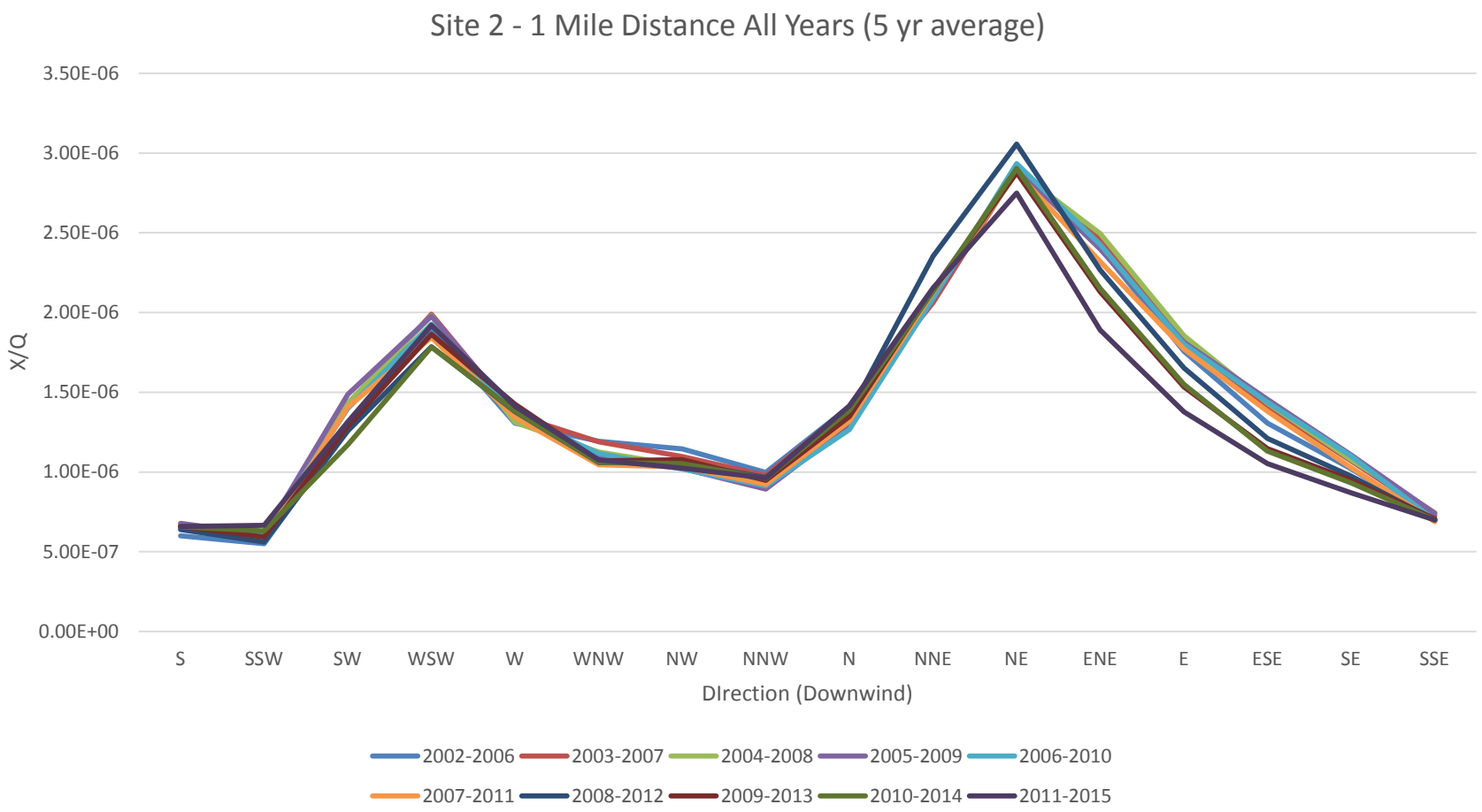
5-YR AVERAGES OF X/Q VALUES AT ONE MILE USING XOQDOQ



5-YR AVERAGES OF X/Q VALUES AT ONE MILE USING HOURLY METEOROLOGICAL DATA



5-YR AVERAGES OF X/Q VALUES AT ONE MILE USING XOQDOQ



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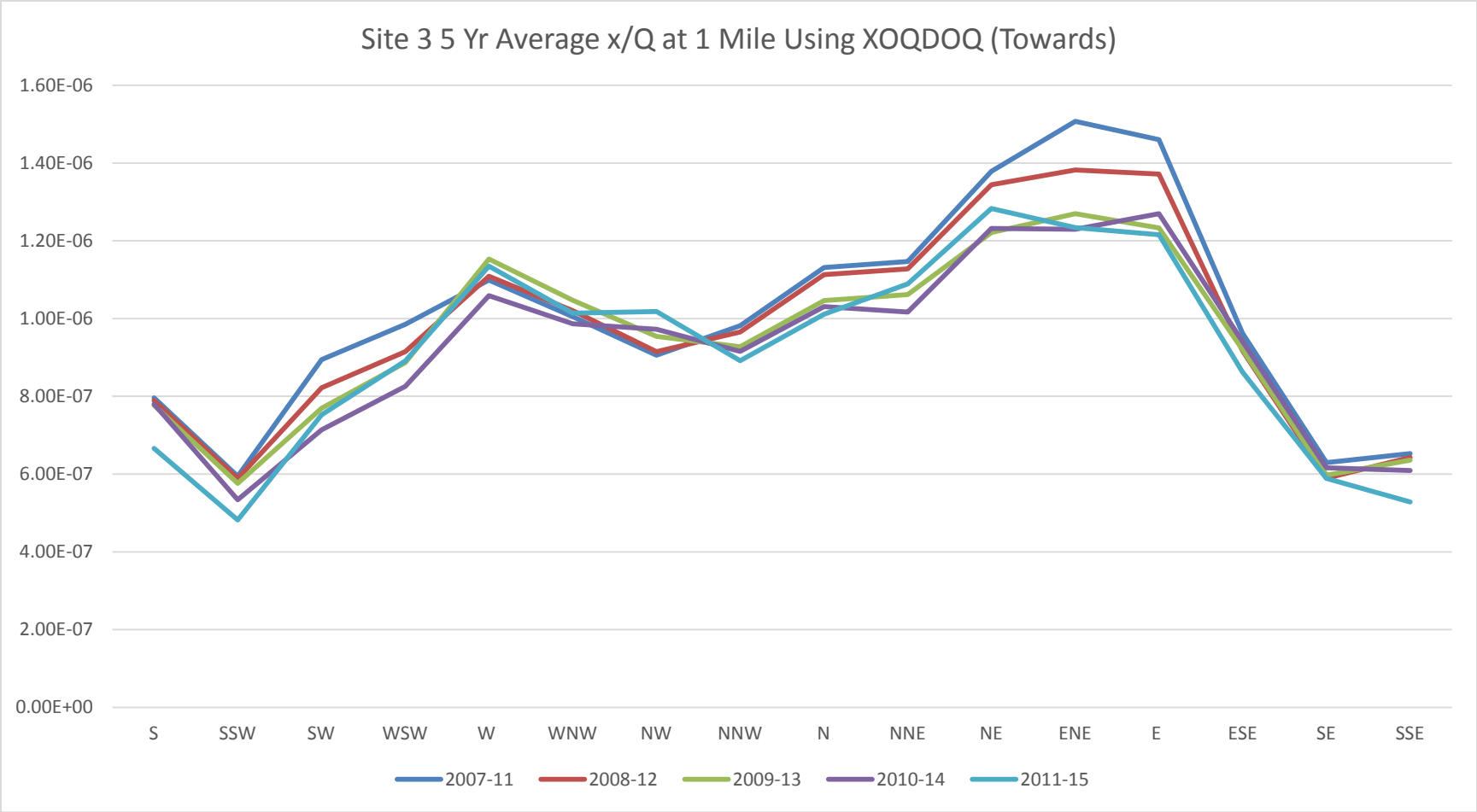
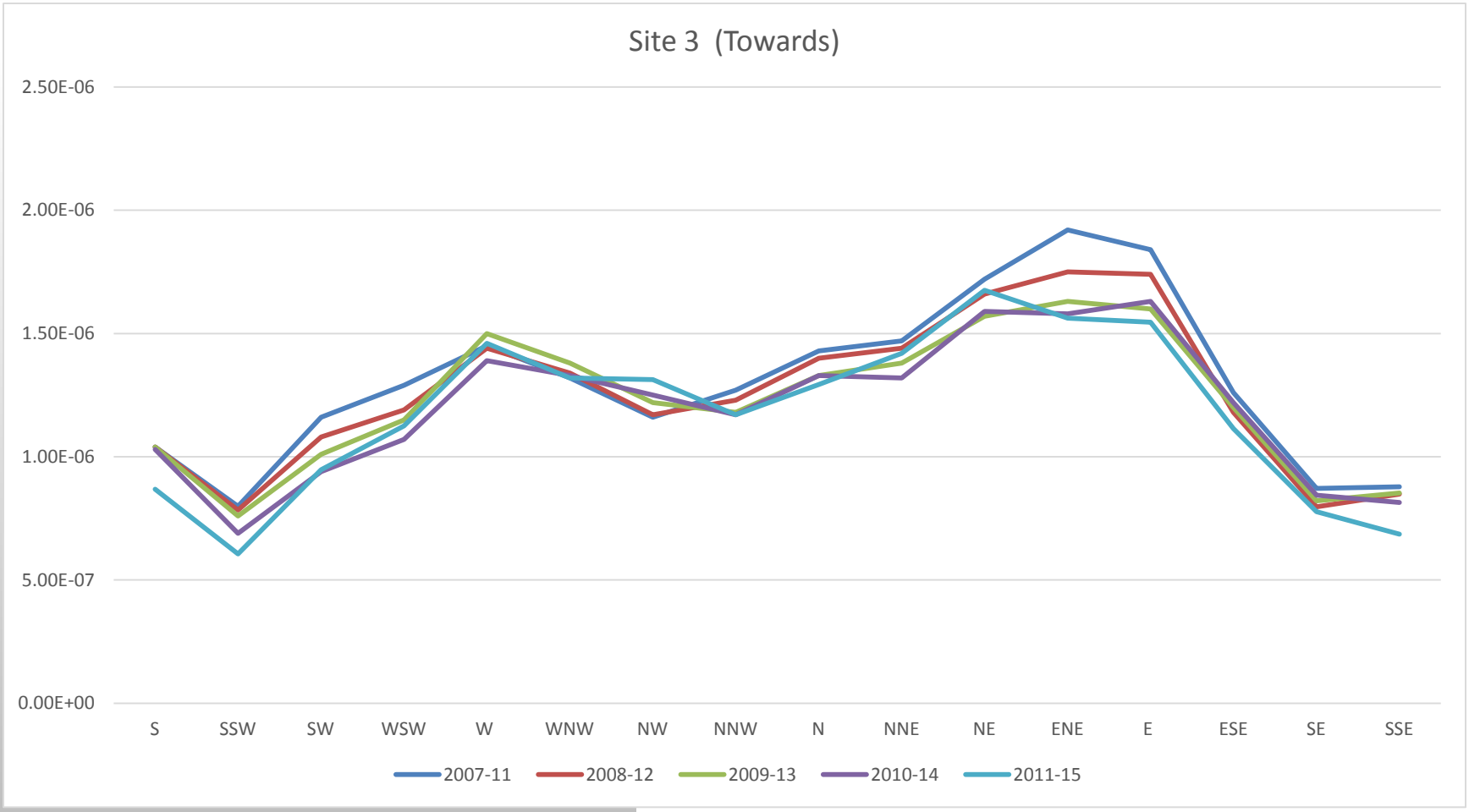
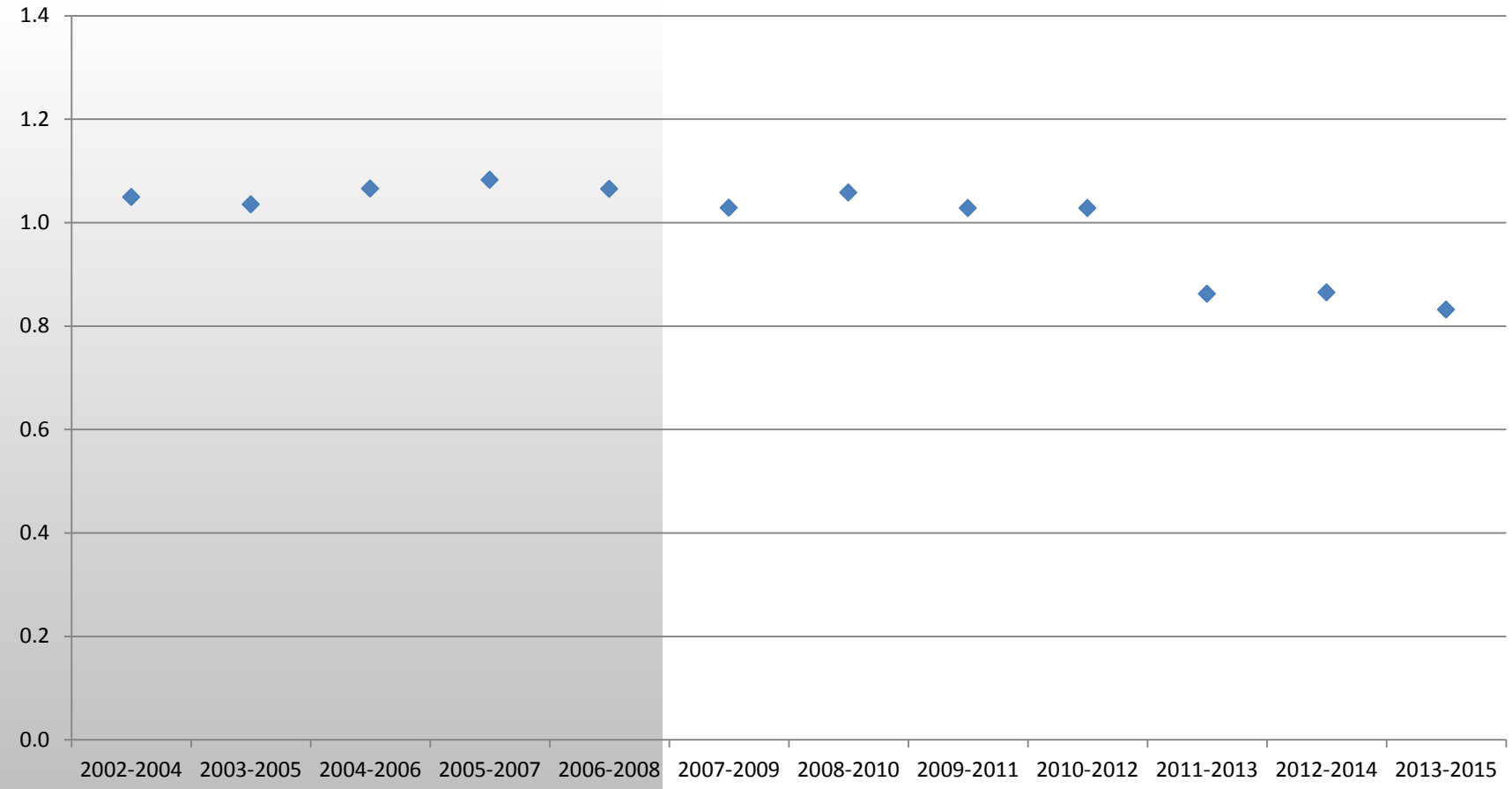


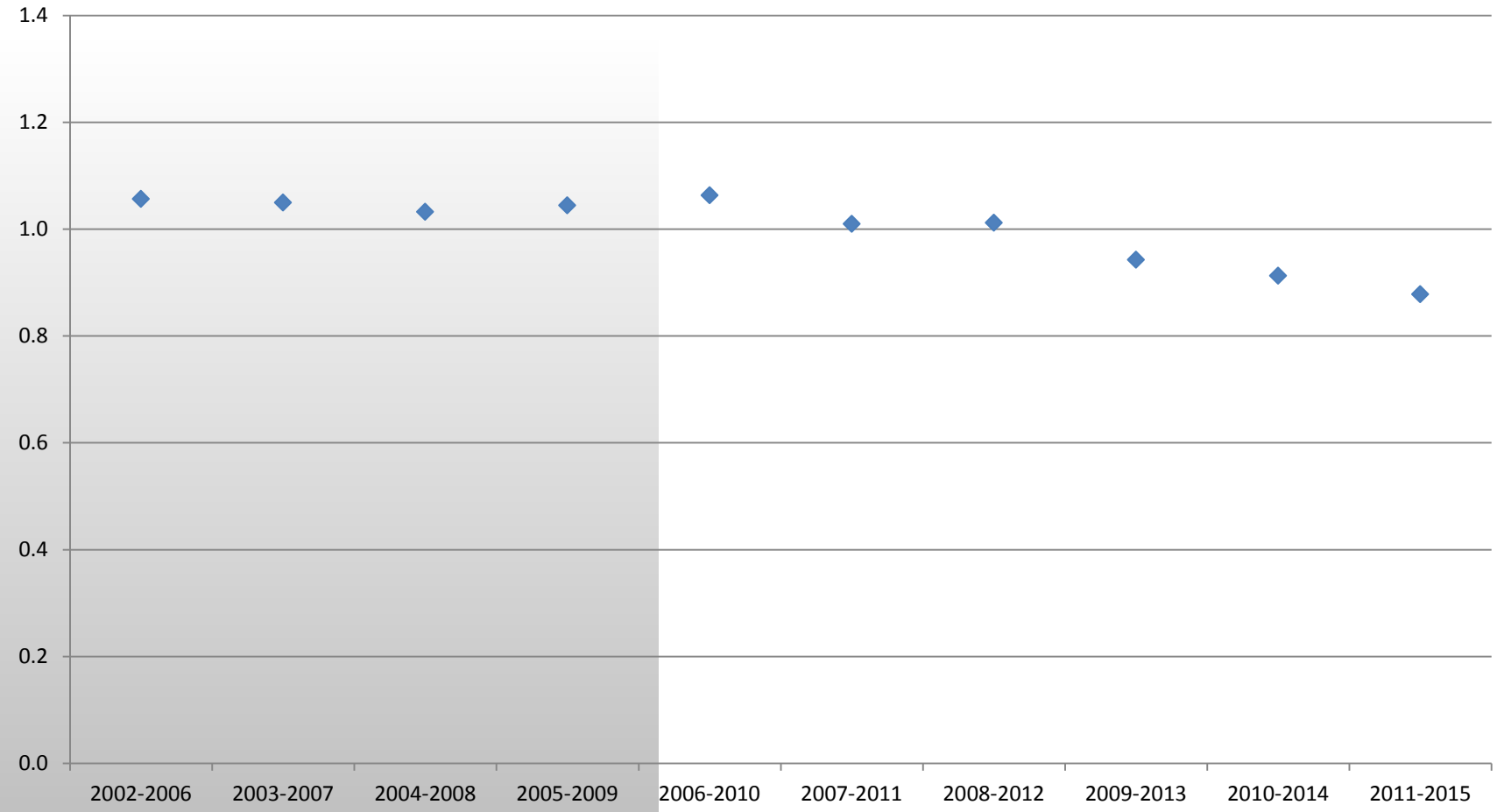
5-YR AVERAGES OF X/Q VALUES AT ONE MILE USING HOURLY MET DATA



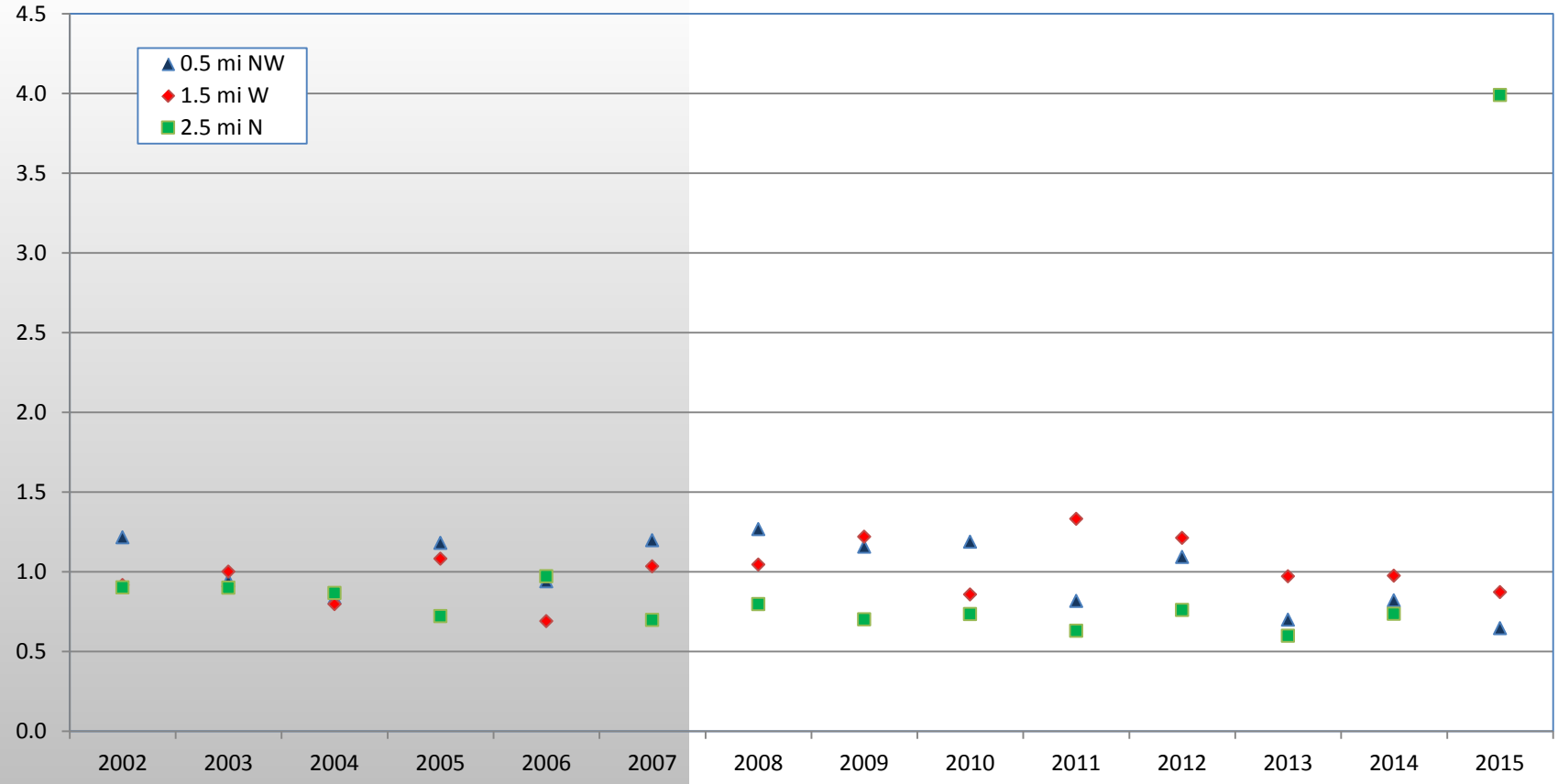
VARIATION IN RELATIVE DOSE – 3 YEAR AVERAGE



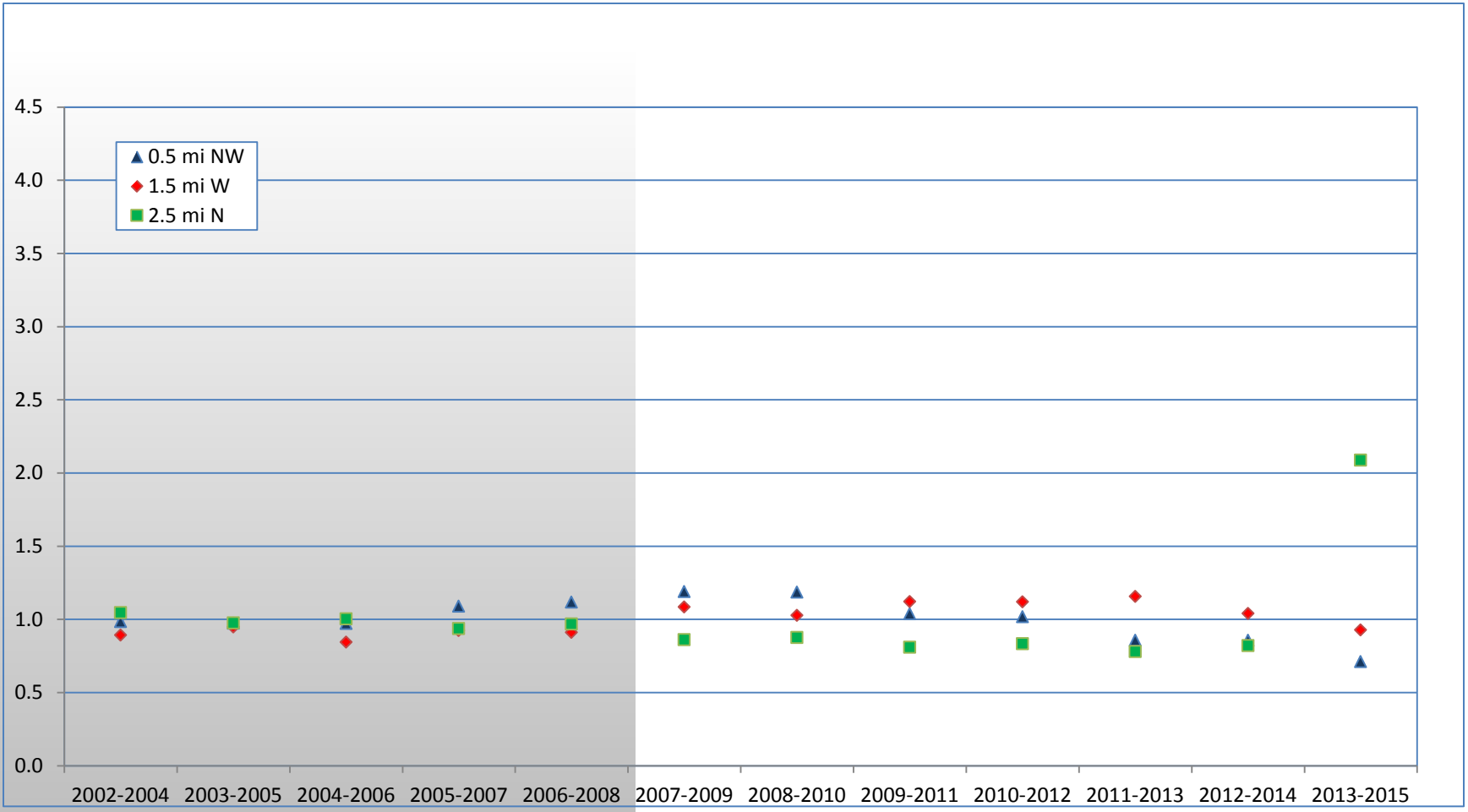
VARIATION IN RELATIVE DOSE 5-YR AVERAGE



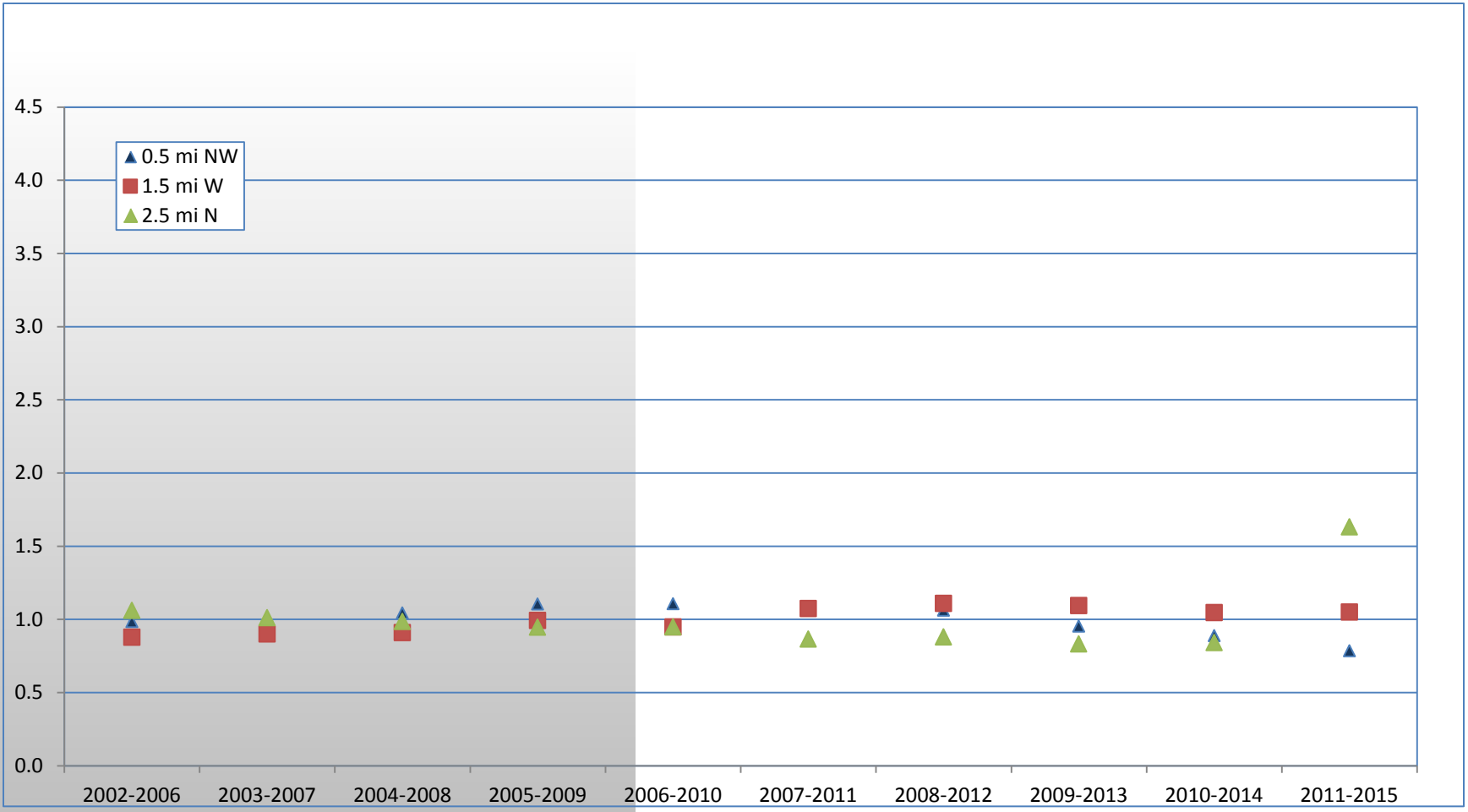
RELATIVE INGESTION DOSE BY FARM LOCATION SINGLE YEAR AVERAGE D/Q



RELATIVE INGESTION DOSE BY FARM LOCATION 3-YR AVERAGE D/Q



RELATIVE INGESTION DOSE BY FARM LOCATION 5-YR AVERAGE D/Q



WHAT CONCLUSIONS HAVE WE REACHED

- Using annual average data can have a factor of roughly 2-4 in variability. This is true for X\Q, D\Q and dose values
- Do not change monitoring locations and long term X/Q and D/Q values based on individual years of data
- It is better to use 3 or 5-year averages when calculating long-term X/Q, D/Q and dose values
- There is little to be gained in going from 3 to 5 year averages
- Using hourly meteorological data will in most cases produce results that are higher by as much as a factor of 2-3
- The difference between using XOQDOQ and a program that uses hourly meteorology was negligable at two of the three sites