

Strain selection and evolution of the virus

Derek Smith

Cambridge University, UK

Professor of infectious disease informatics

Director Center for Pathogen Evolution

Director WHO Collaborating Center for Modeling Evolution and Control
of Emerging Infectious Diseases

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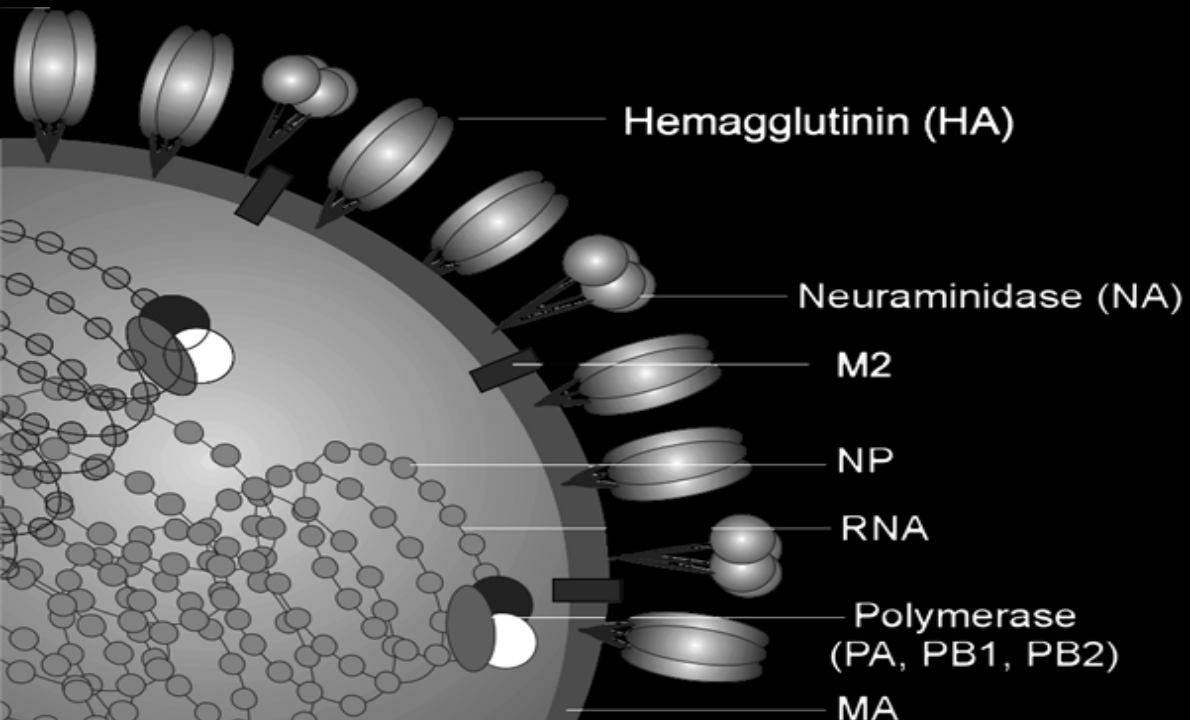
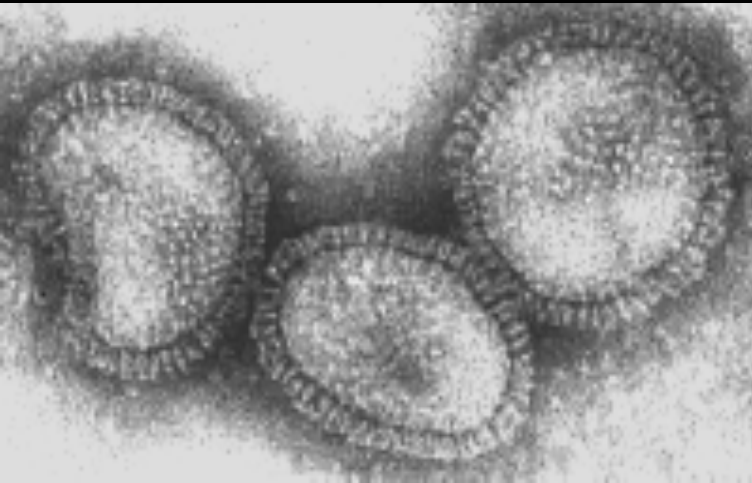
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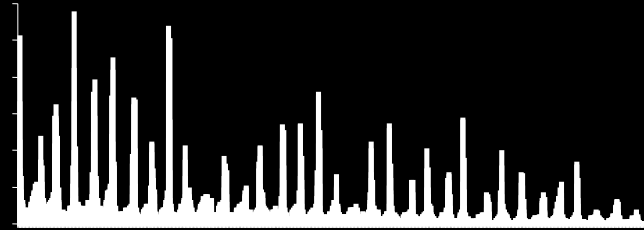
Director WHO Collaborating Center for Modeling Evolution and Control
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Influenza virus

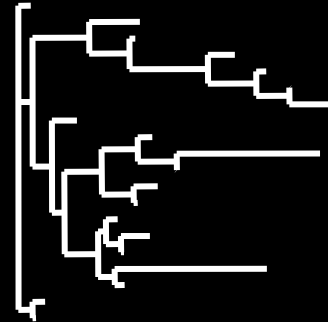


WHO global influenza surveillance and response system

Epidemiological



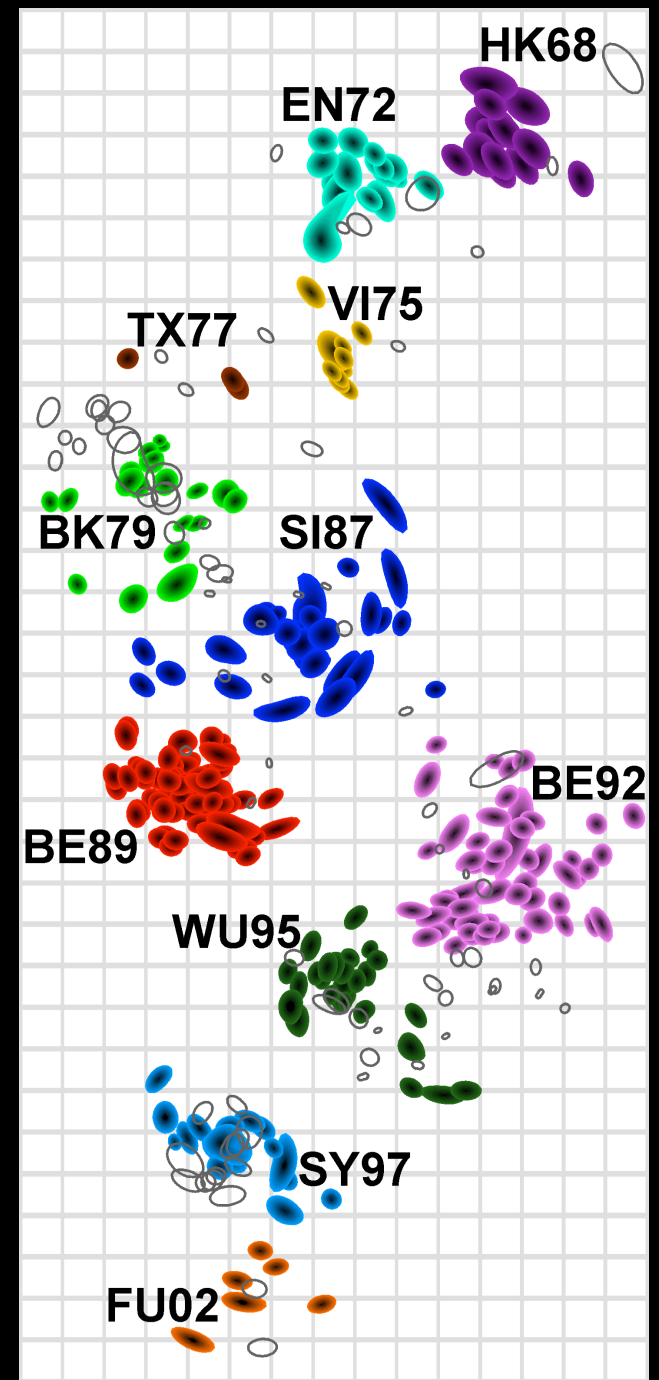
Genetic



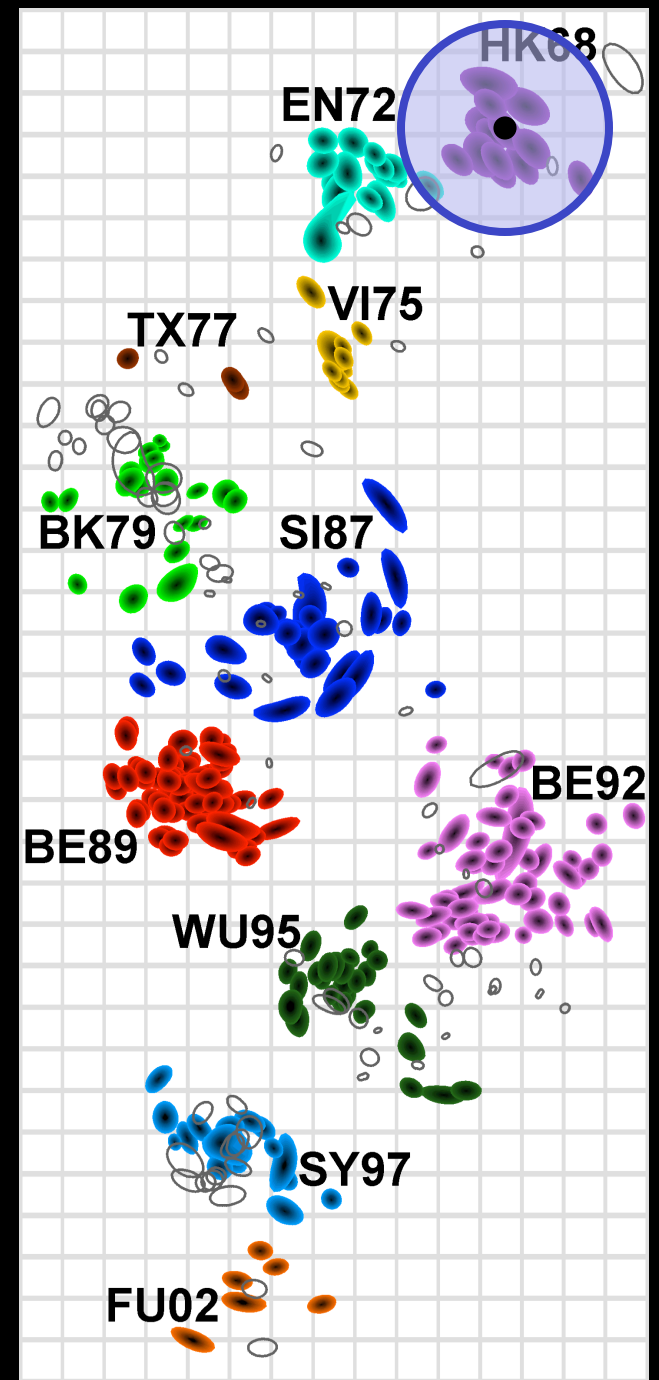
Antigenic

Raw tabular data
qualitative interpretation only
paradoxes in data

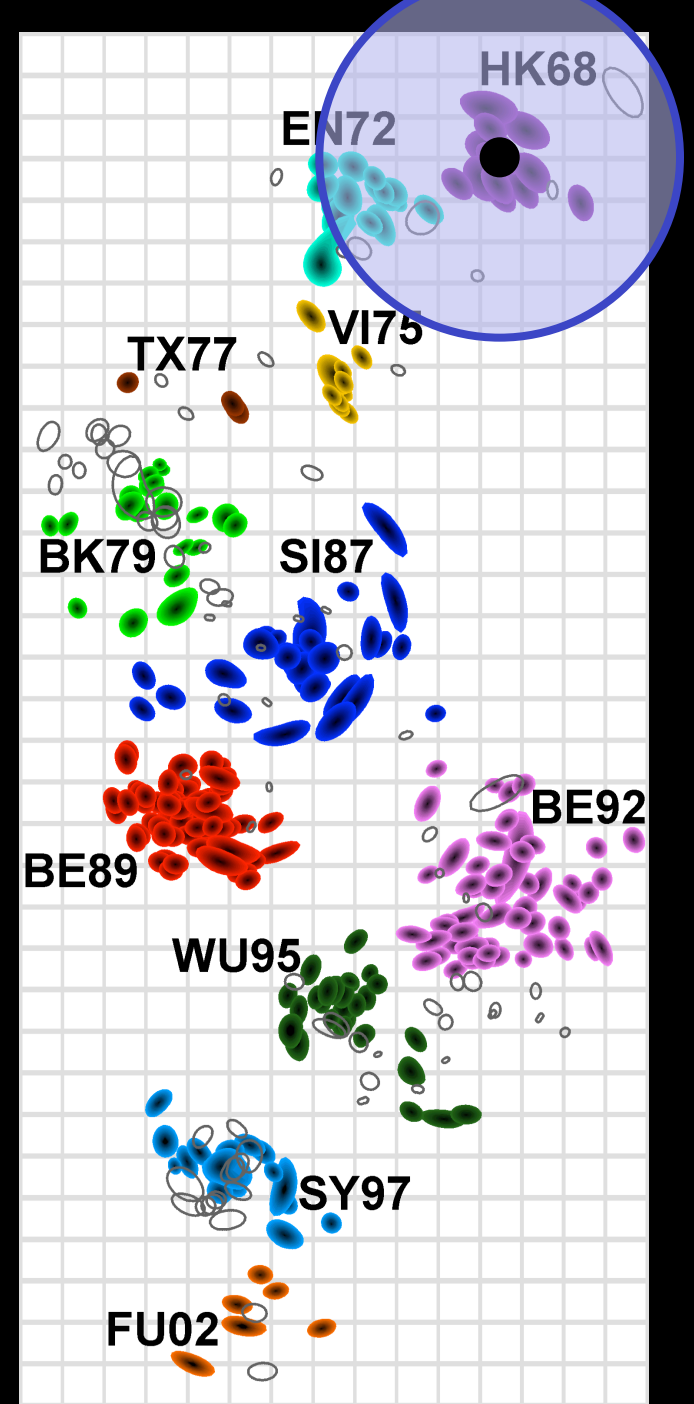
Antigenic map Influenza A (H3N2) 1968-2004



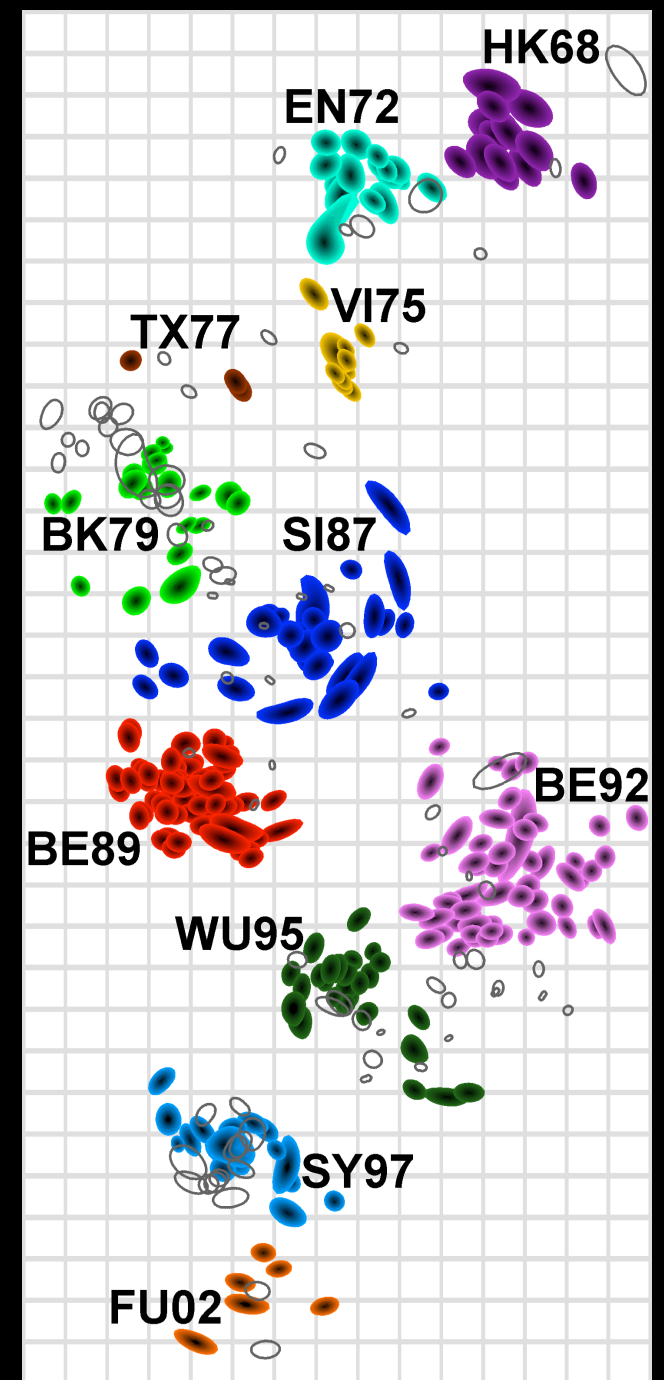
Antigenic map Influenza A (H3N2) 1968-2004



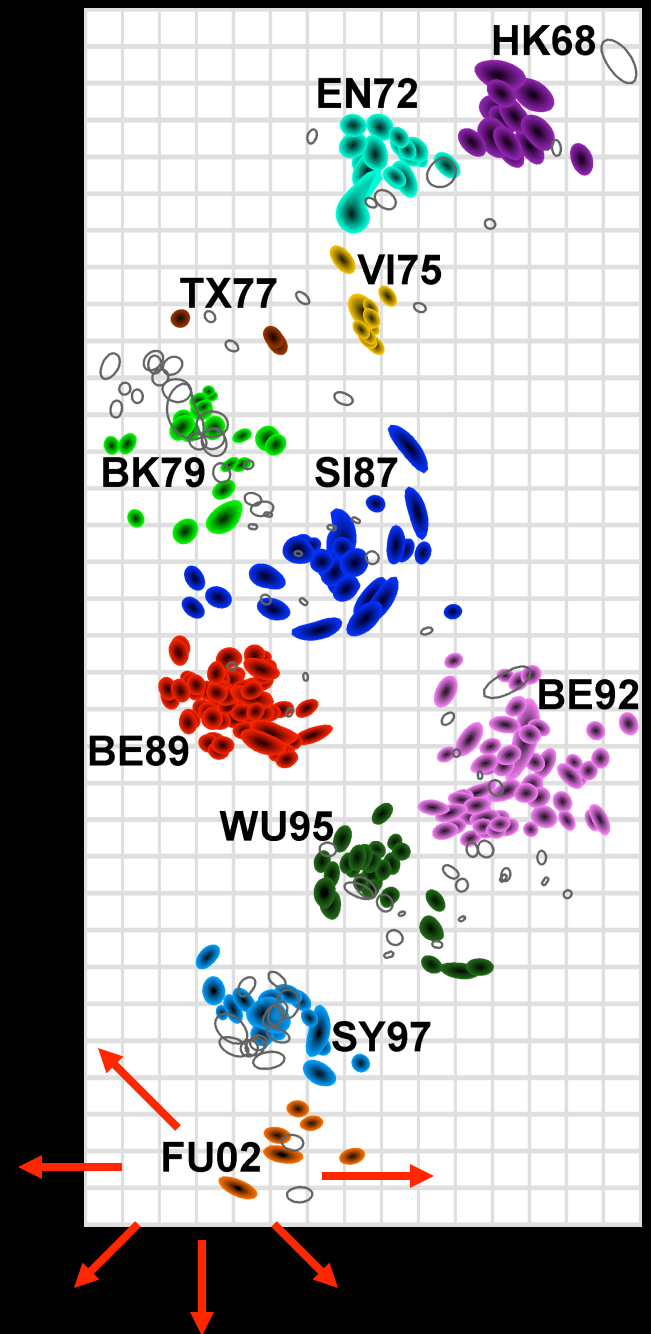
Antigenic map Influenza A (H3N2) 1968-2004



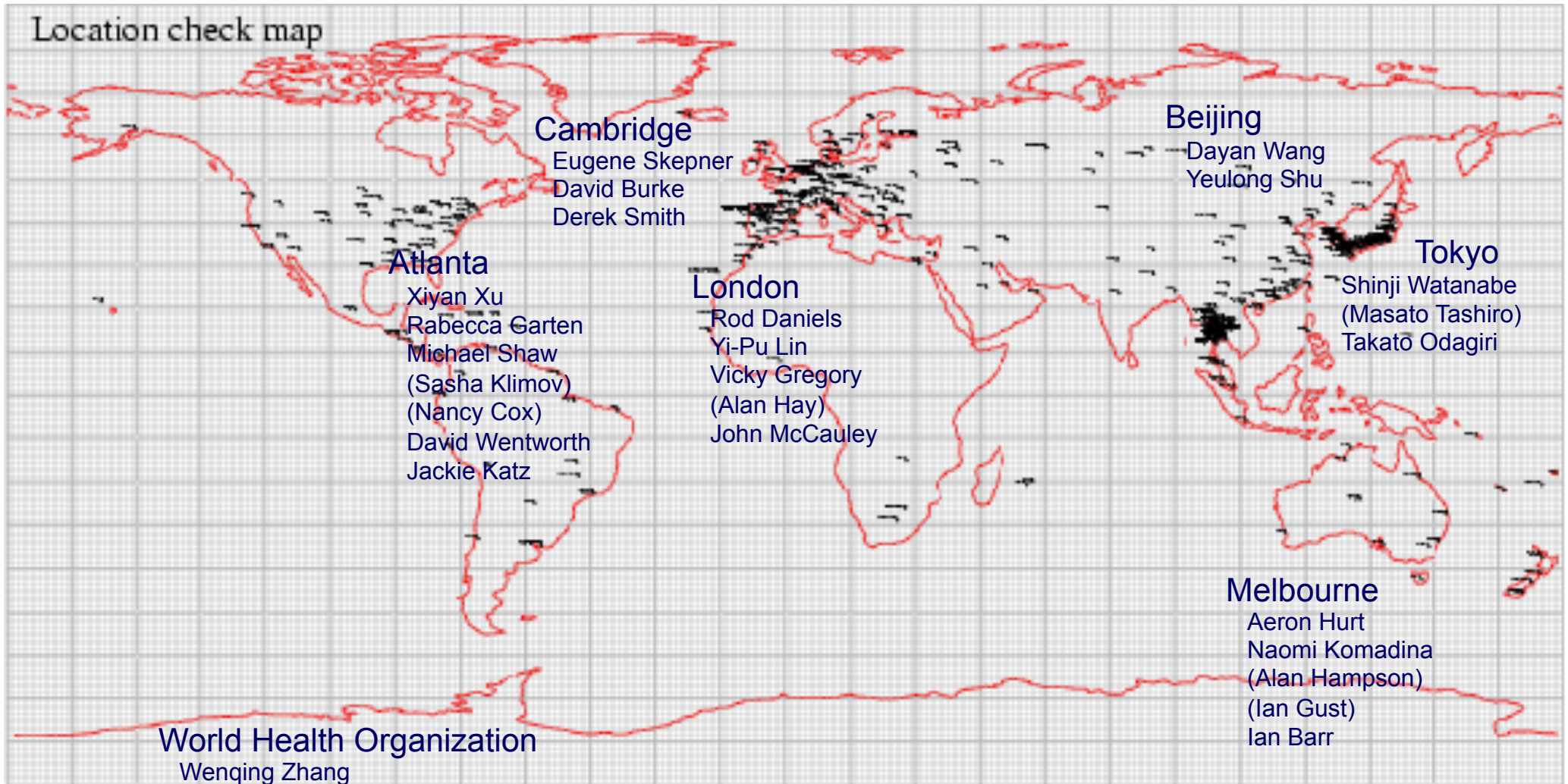
Antigenic map Influenza A (H3N2) 1968-2004



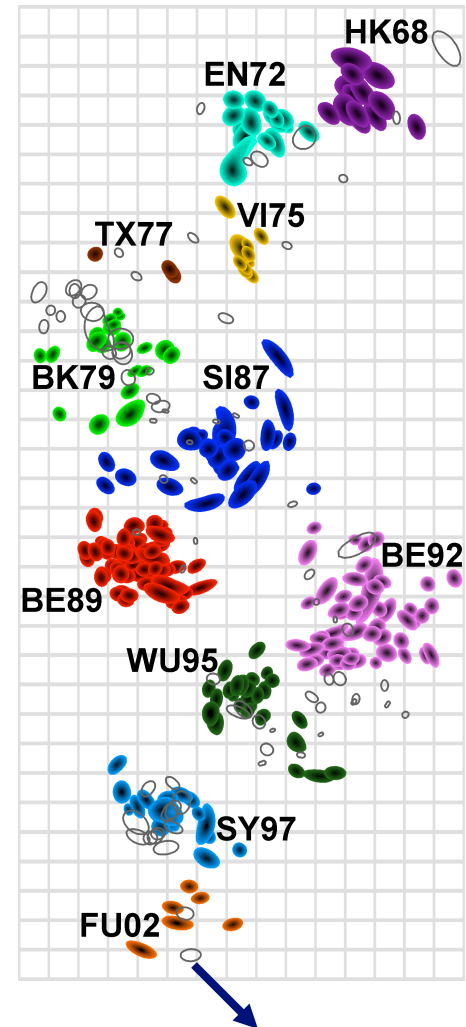
What next?



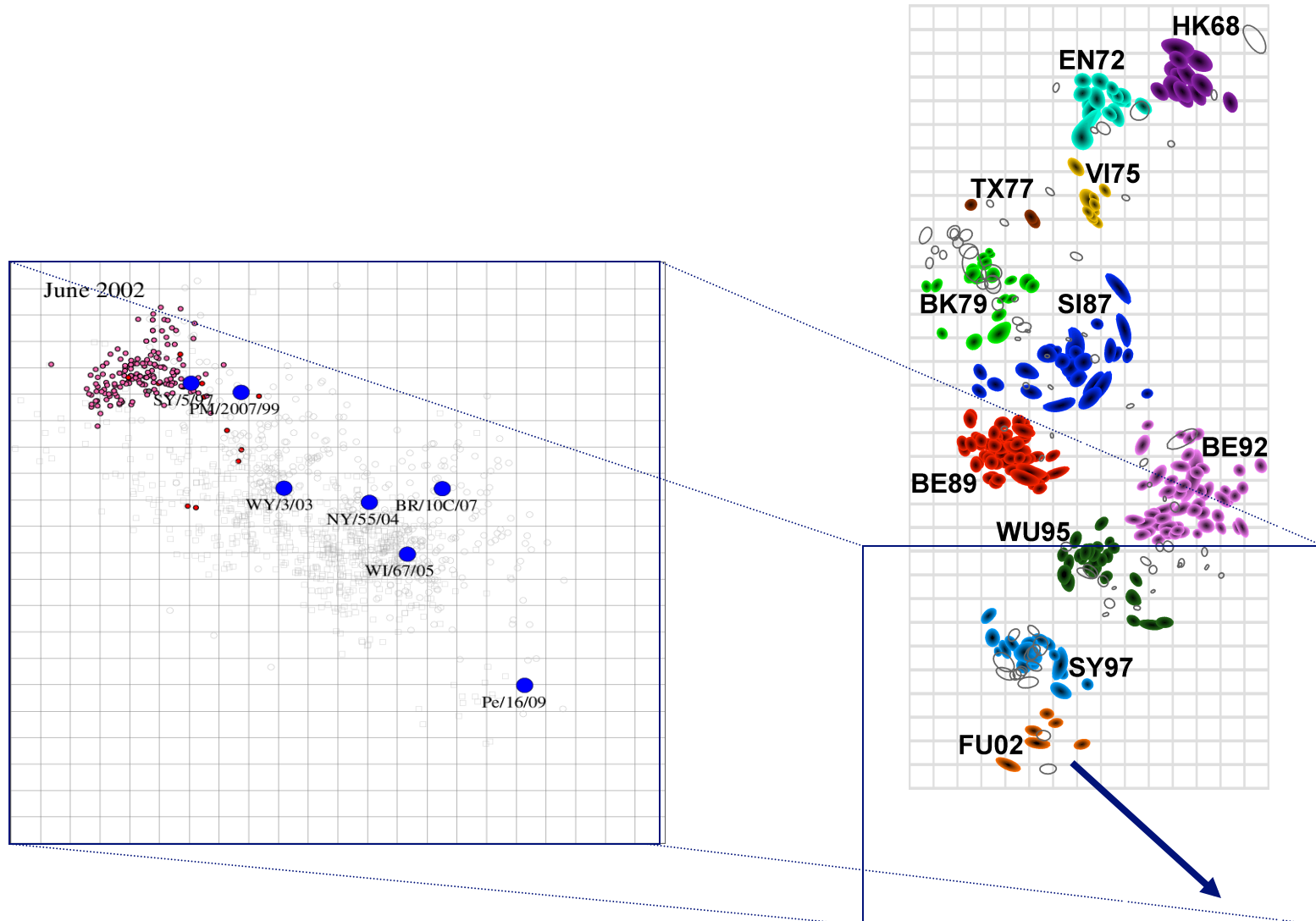
Locations



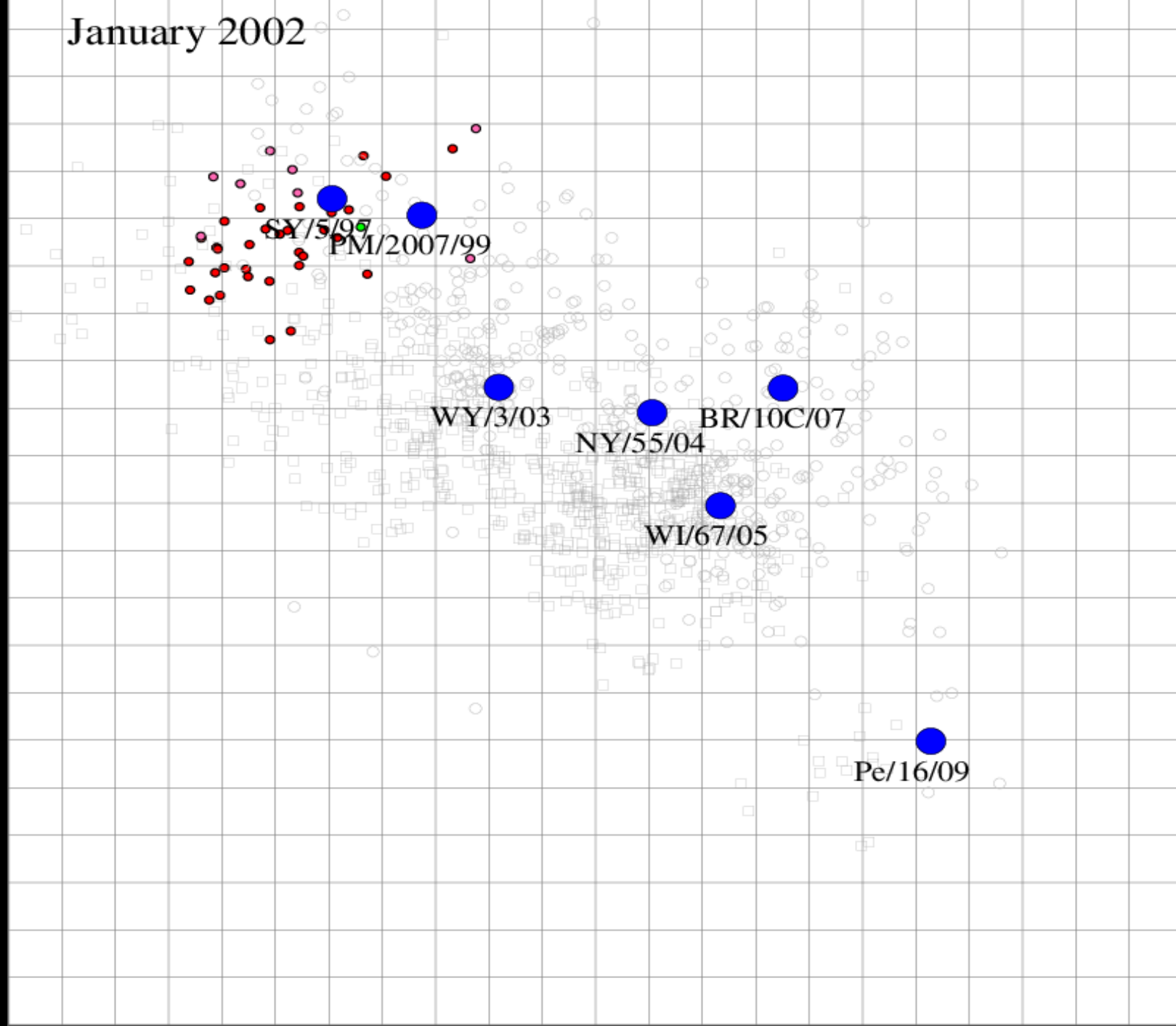
Fujian-California cluster transition



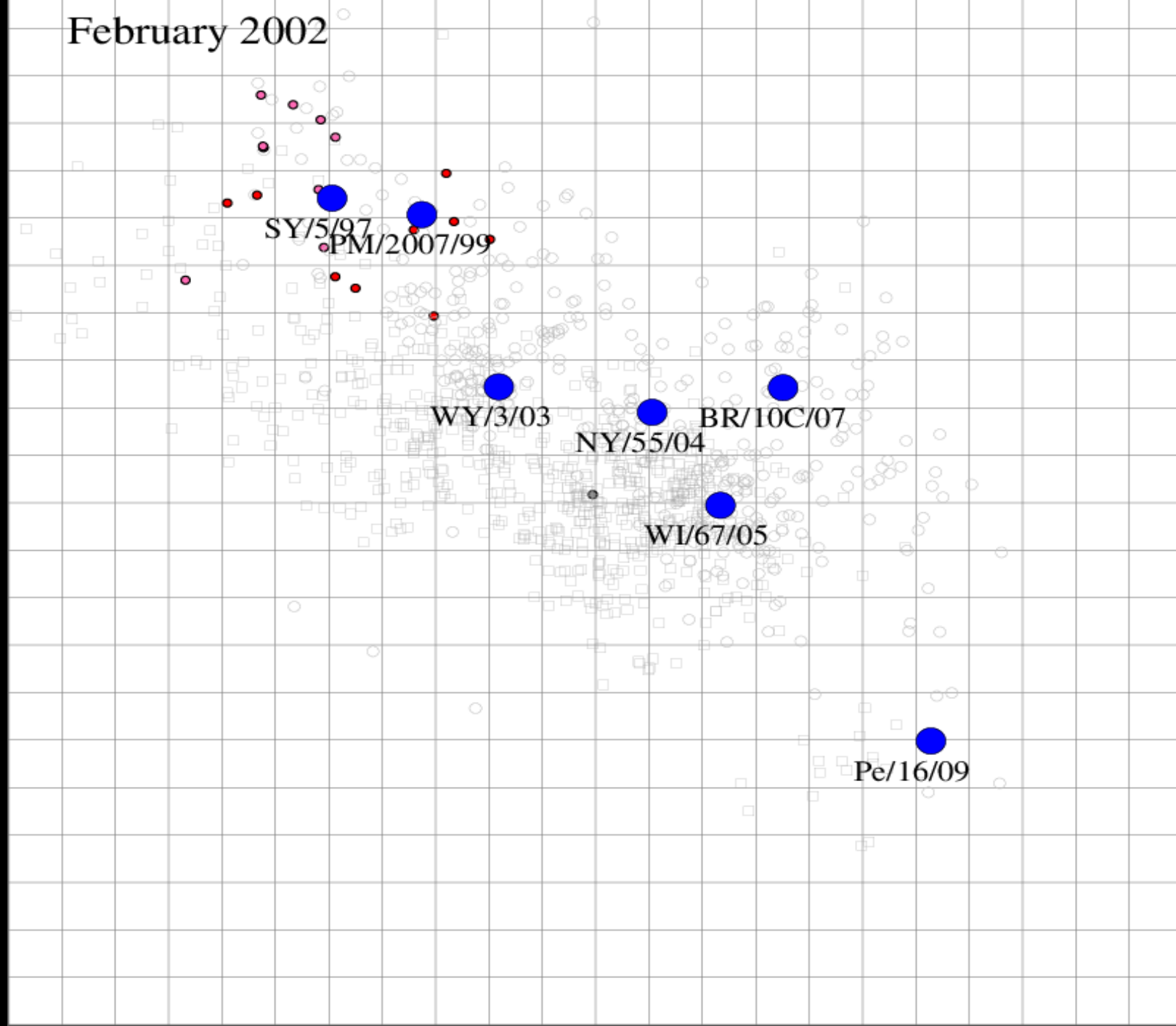
Fujian-California cluster transition



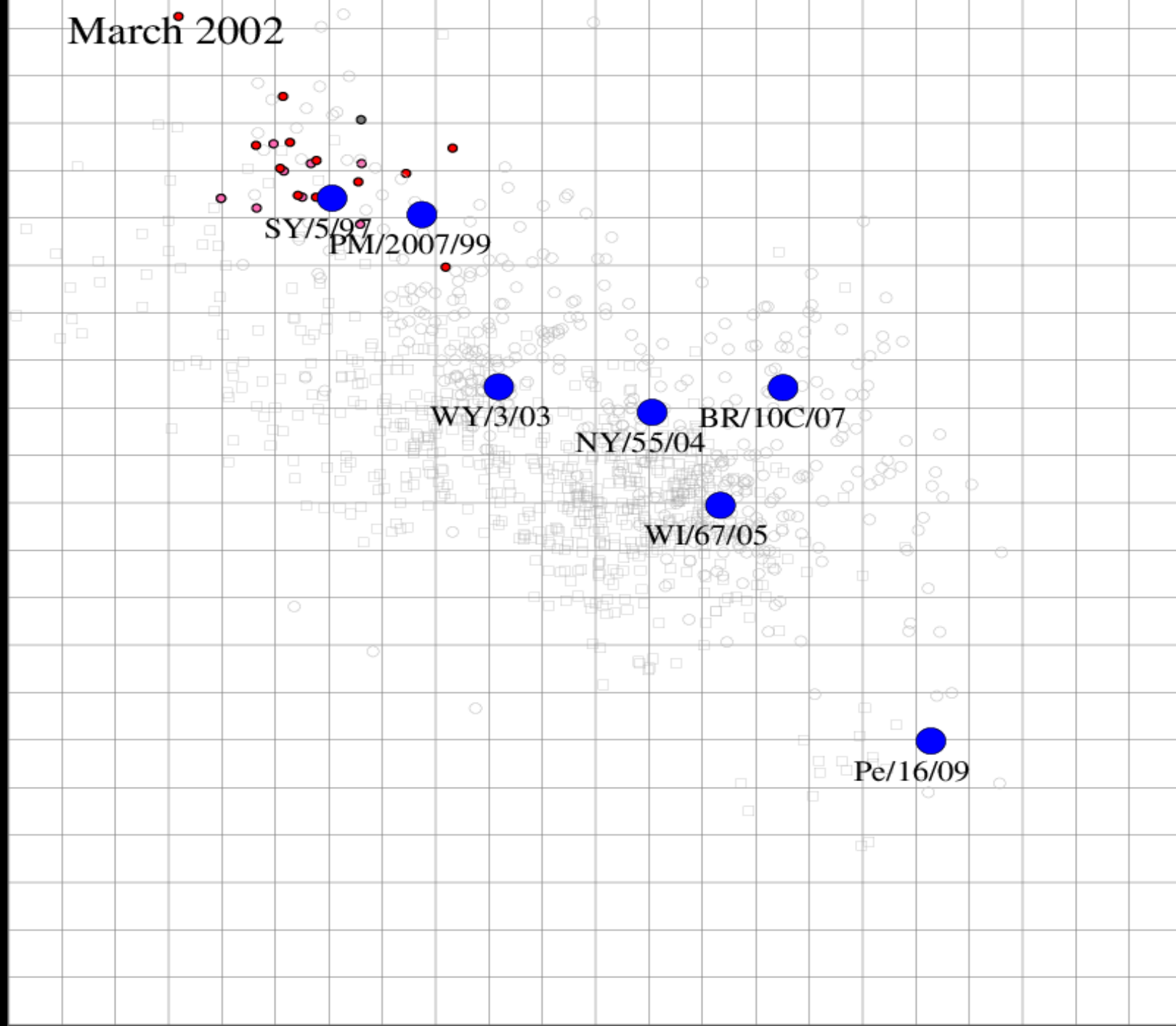
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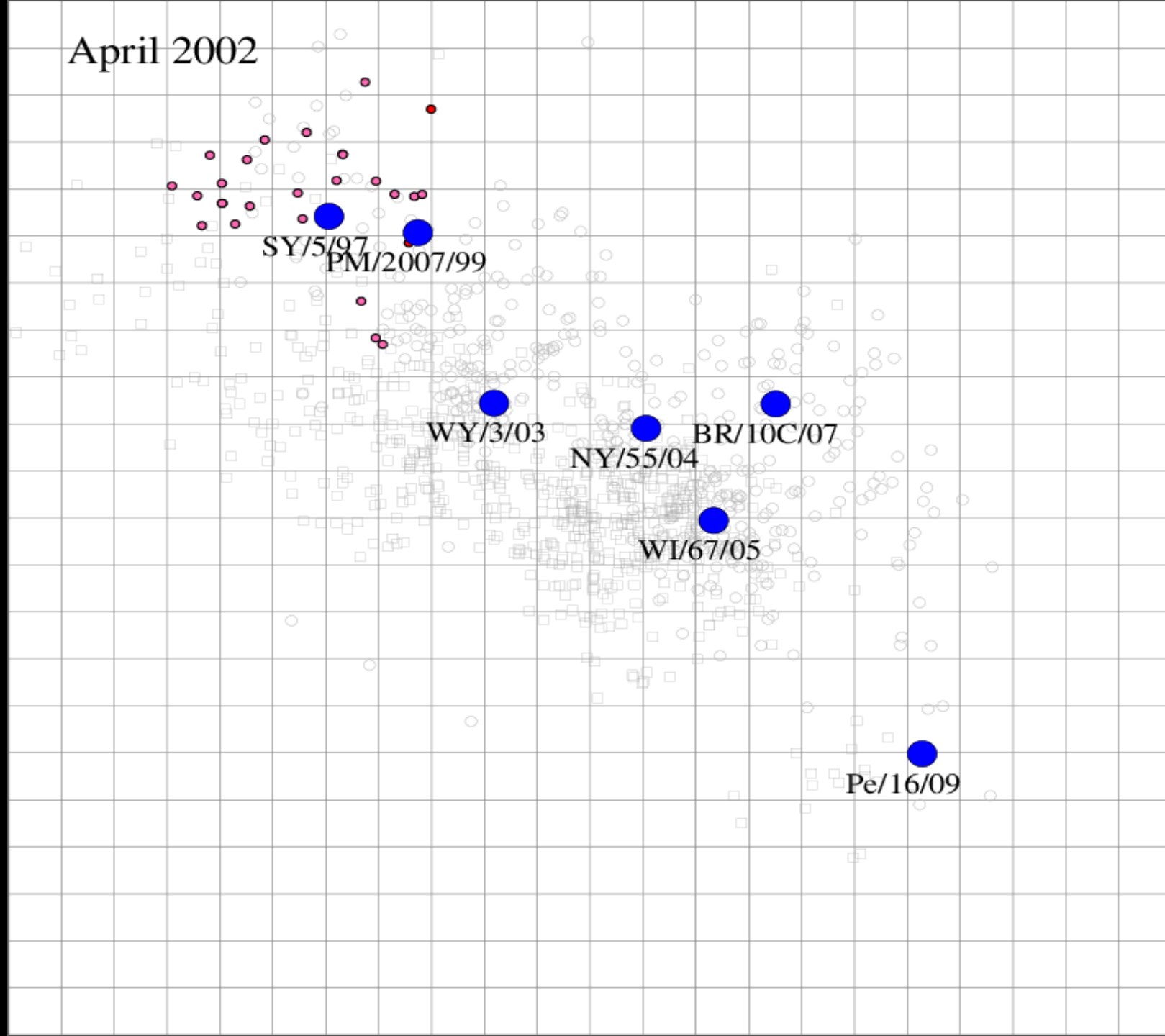
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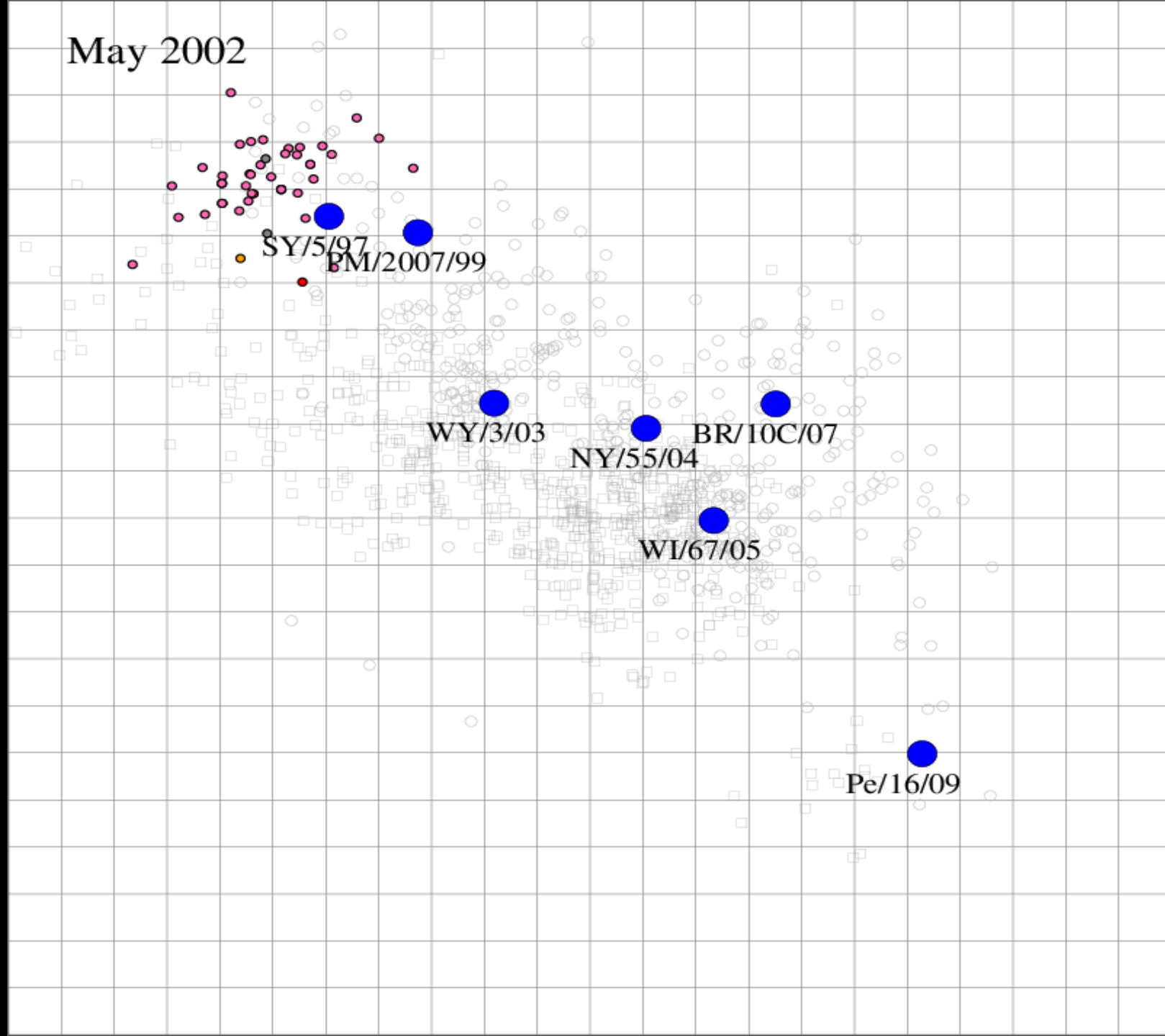
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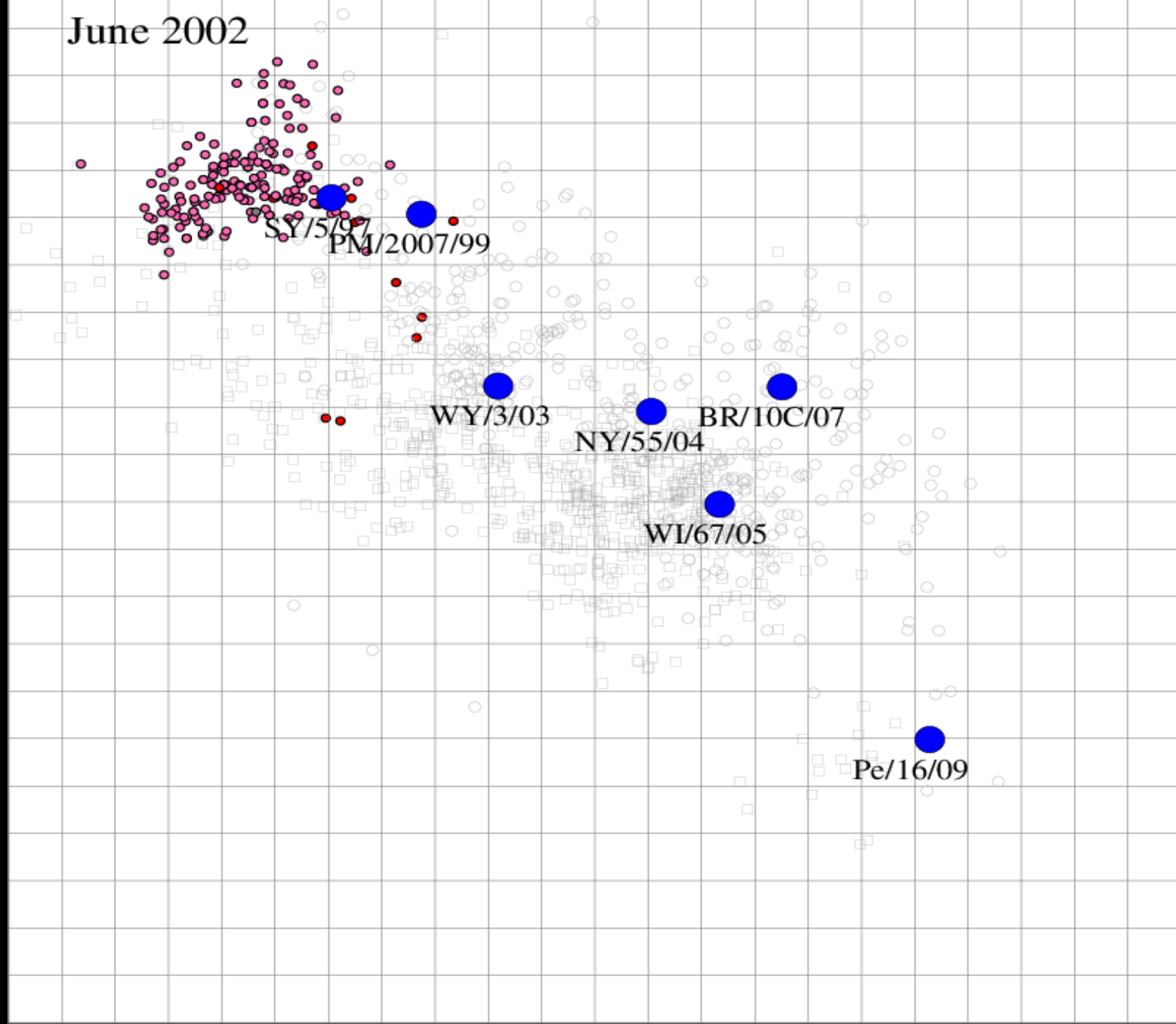
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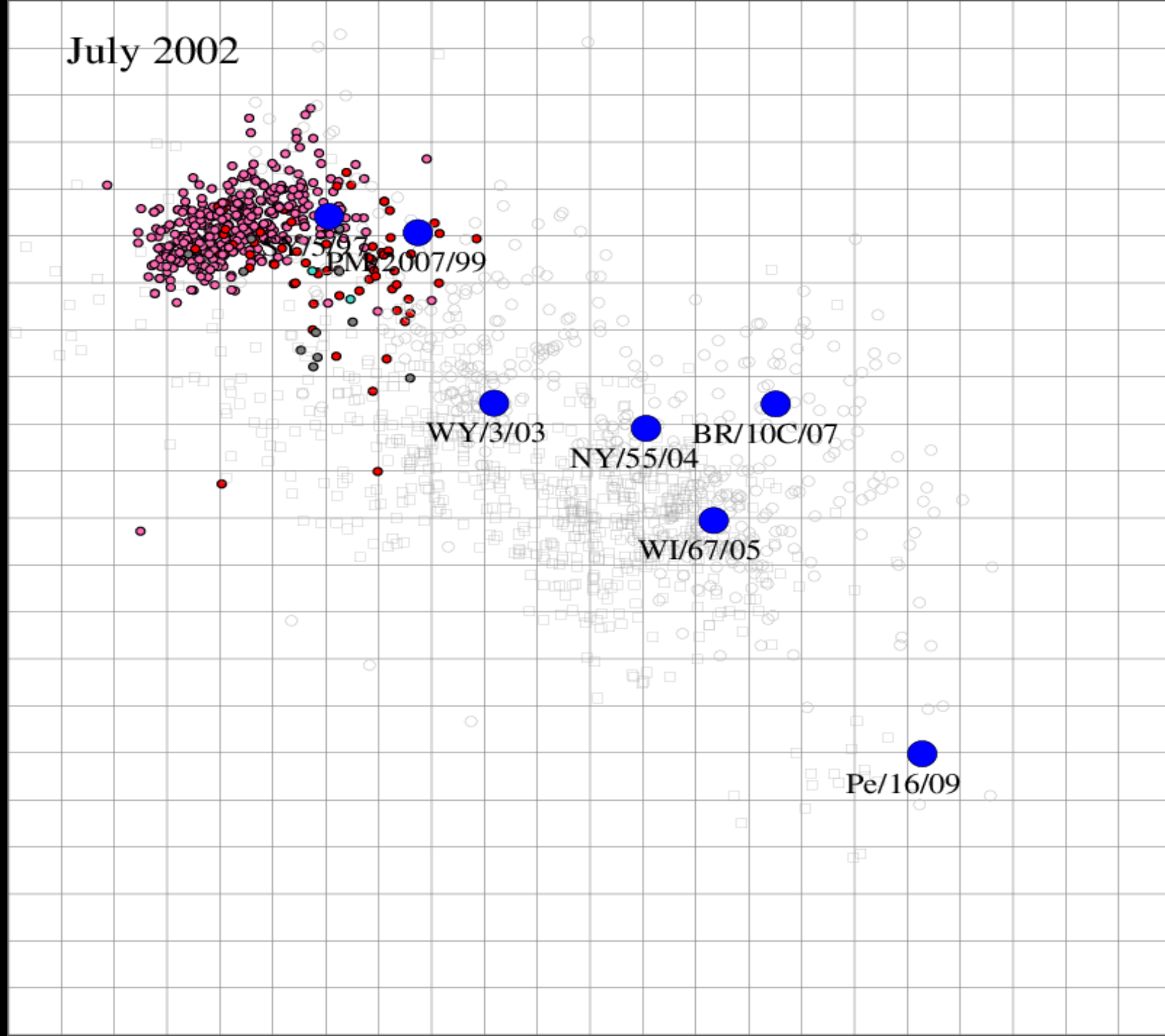
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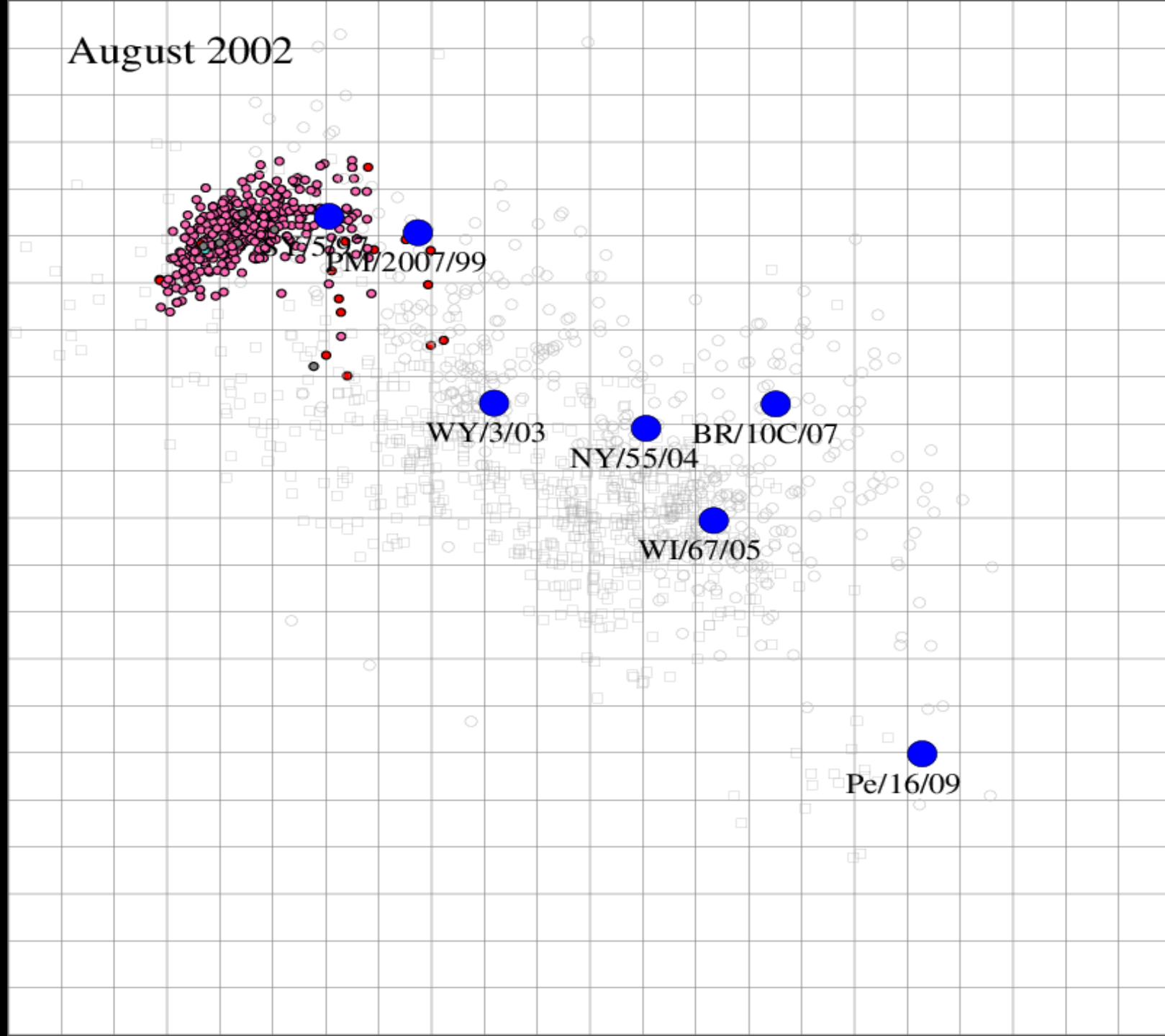
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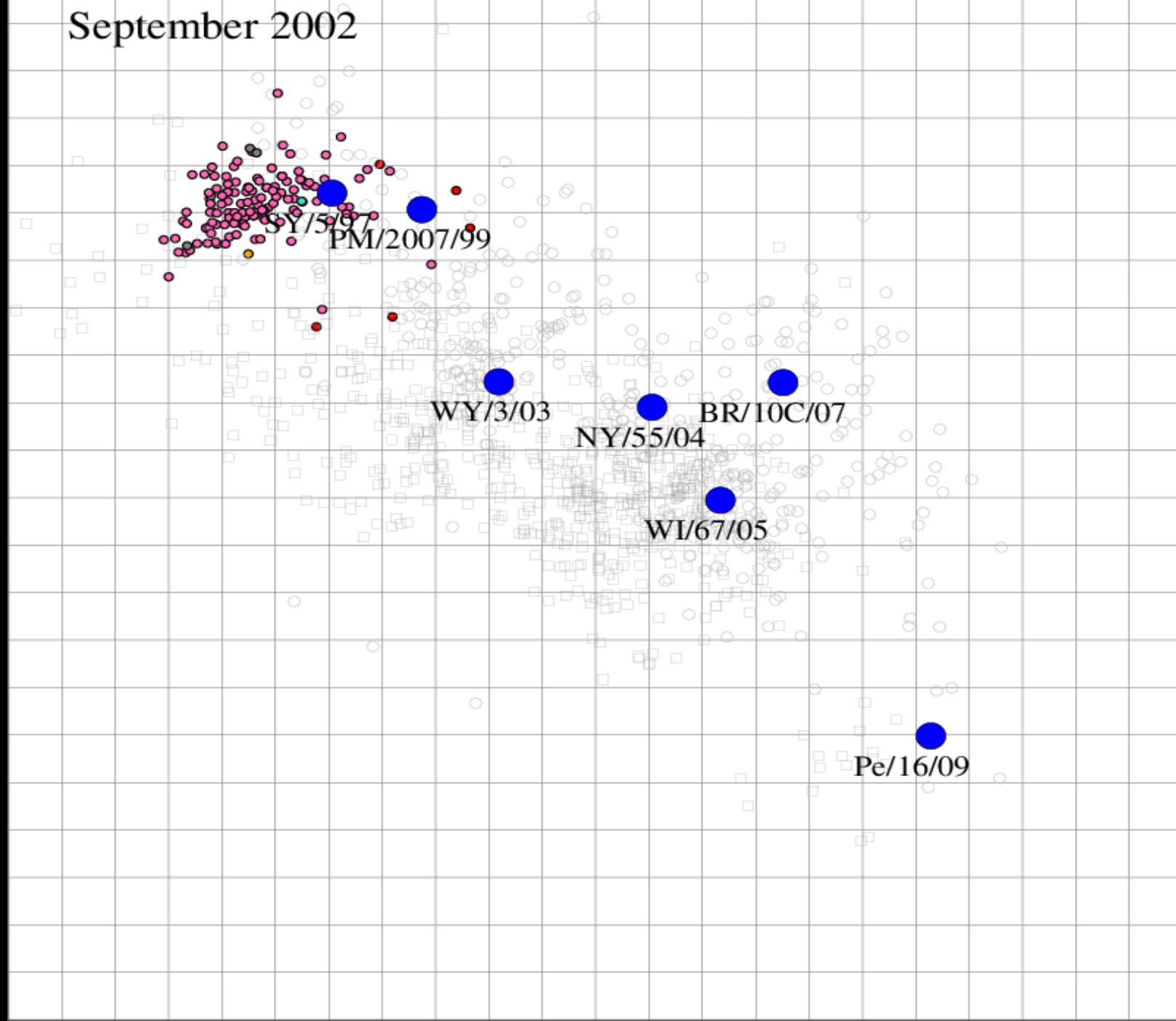
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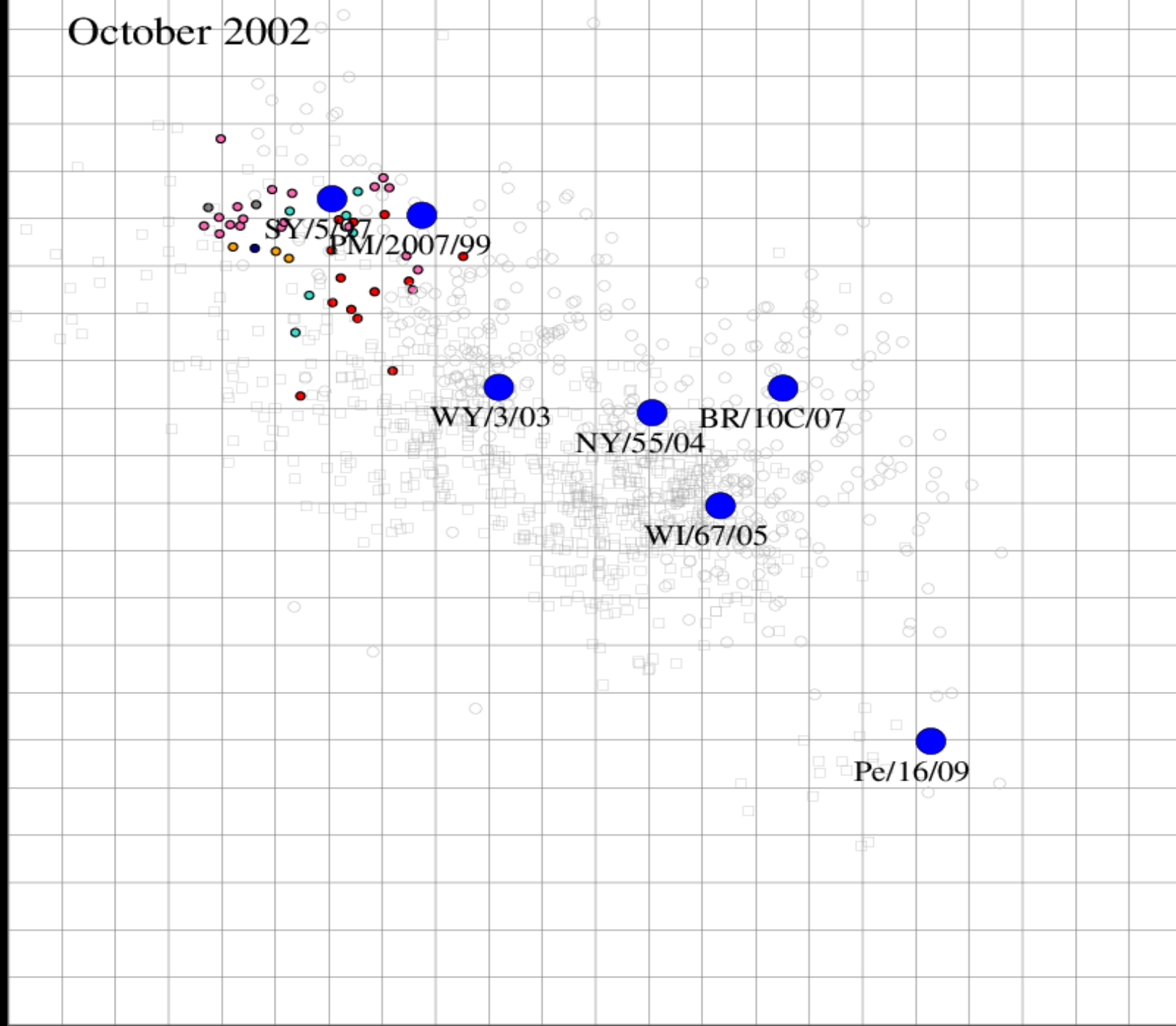
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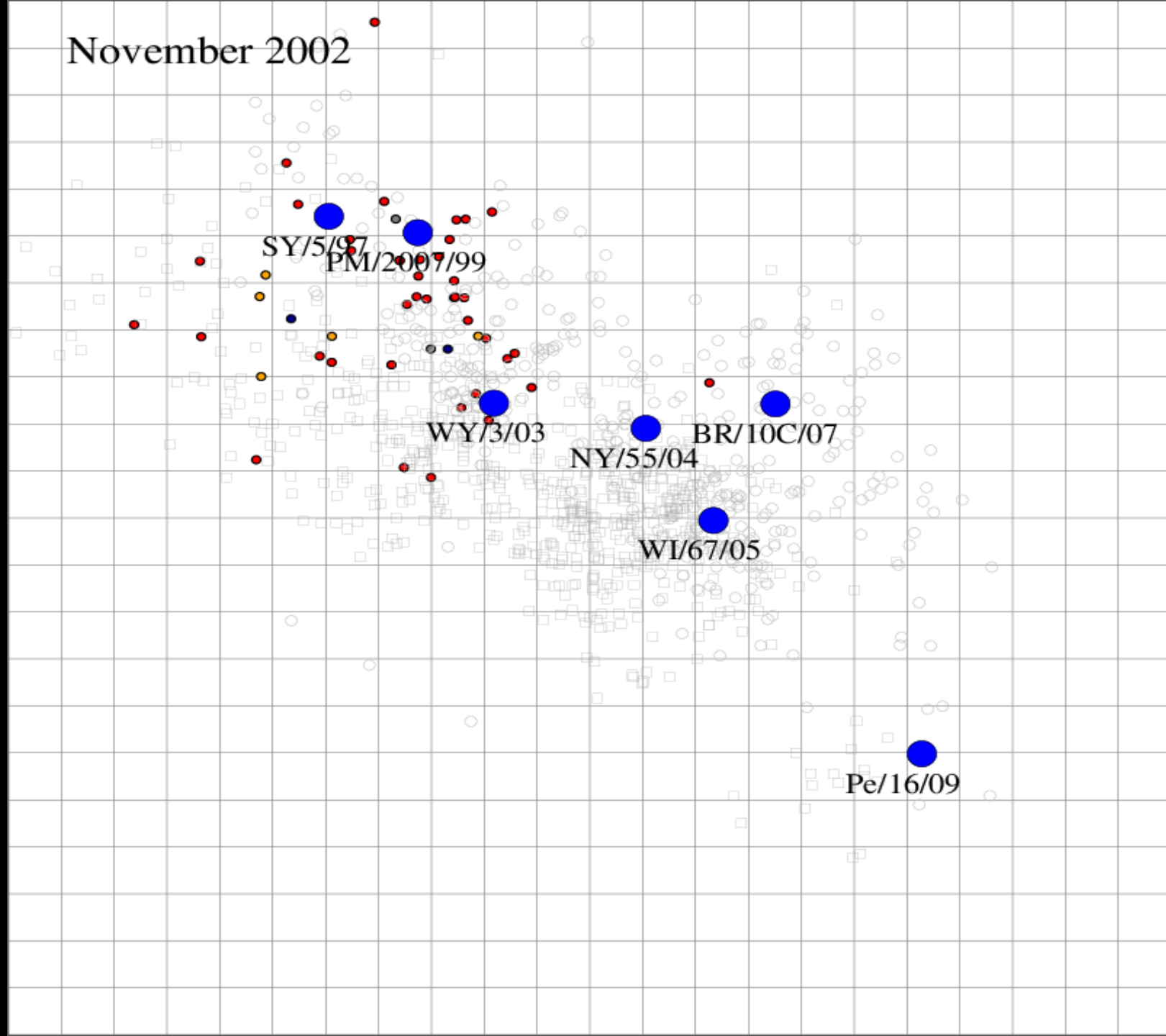
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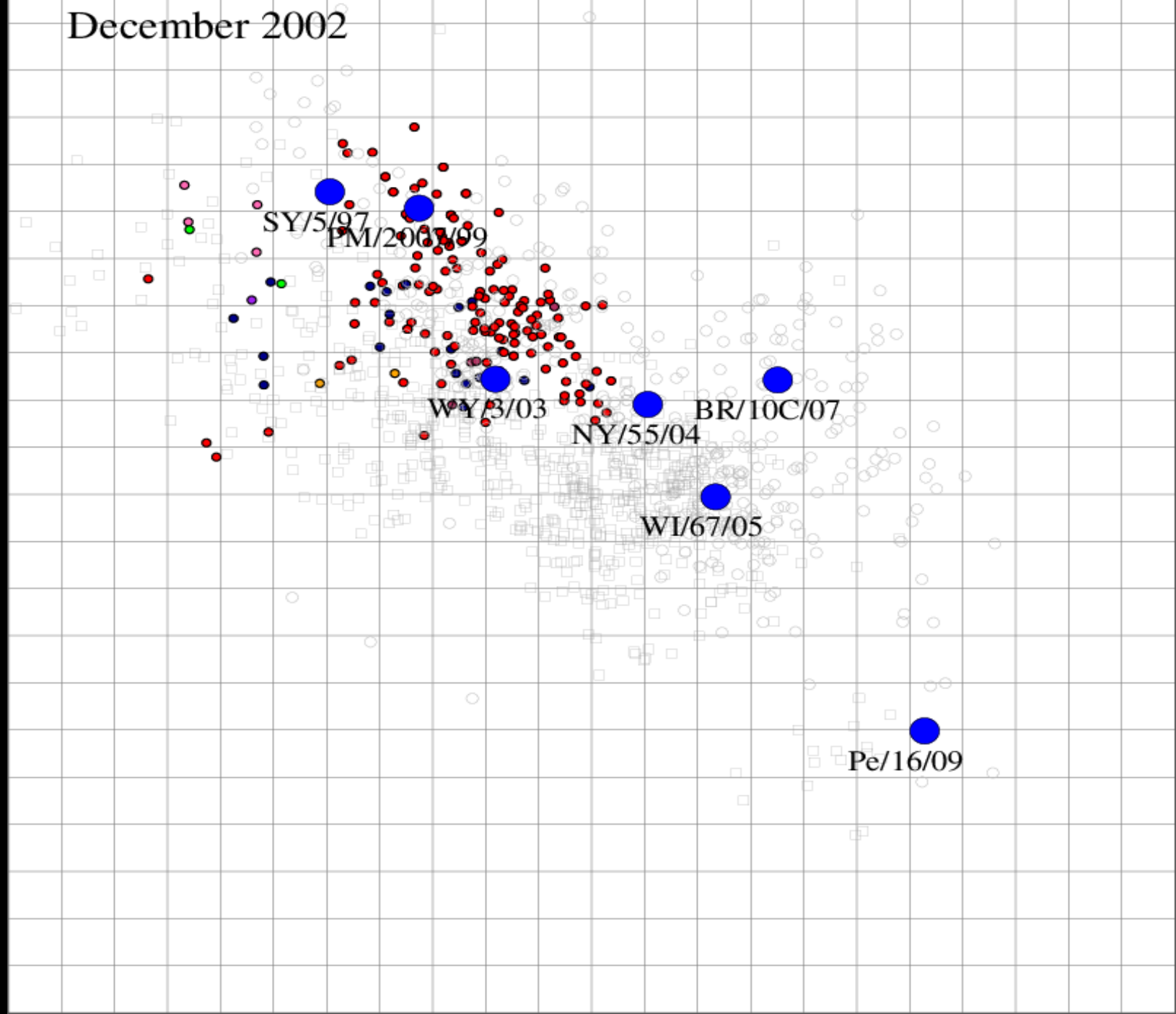
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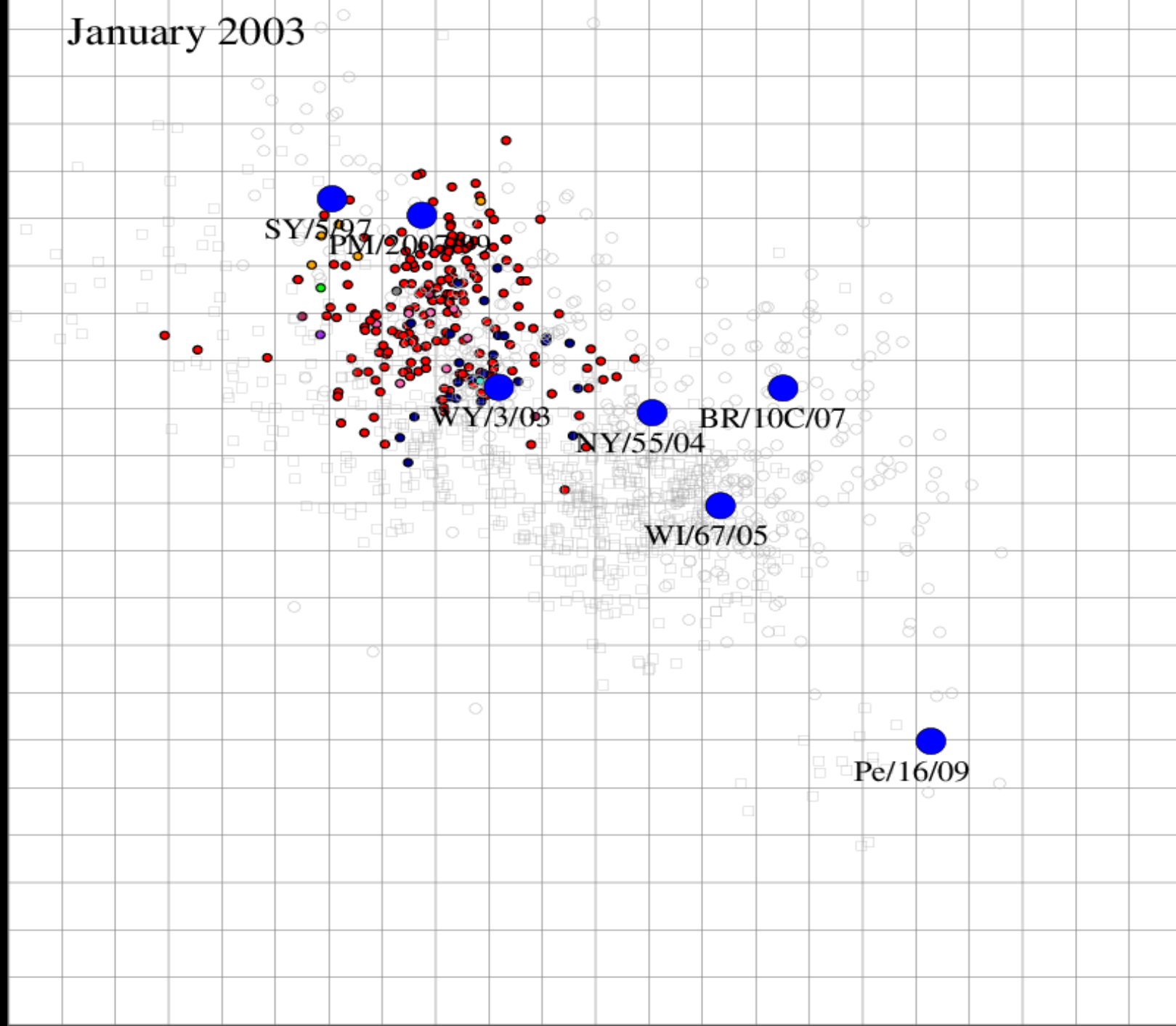
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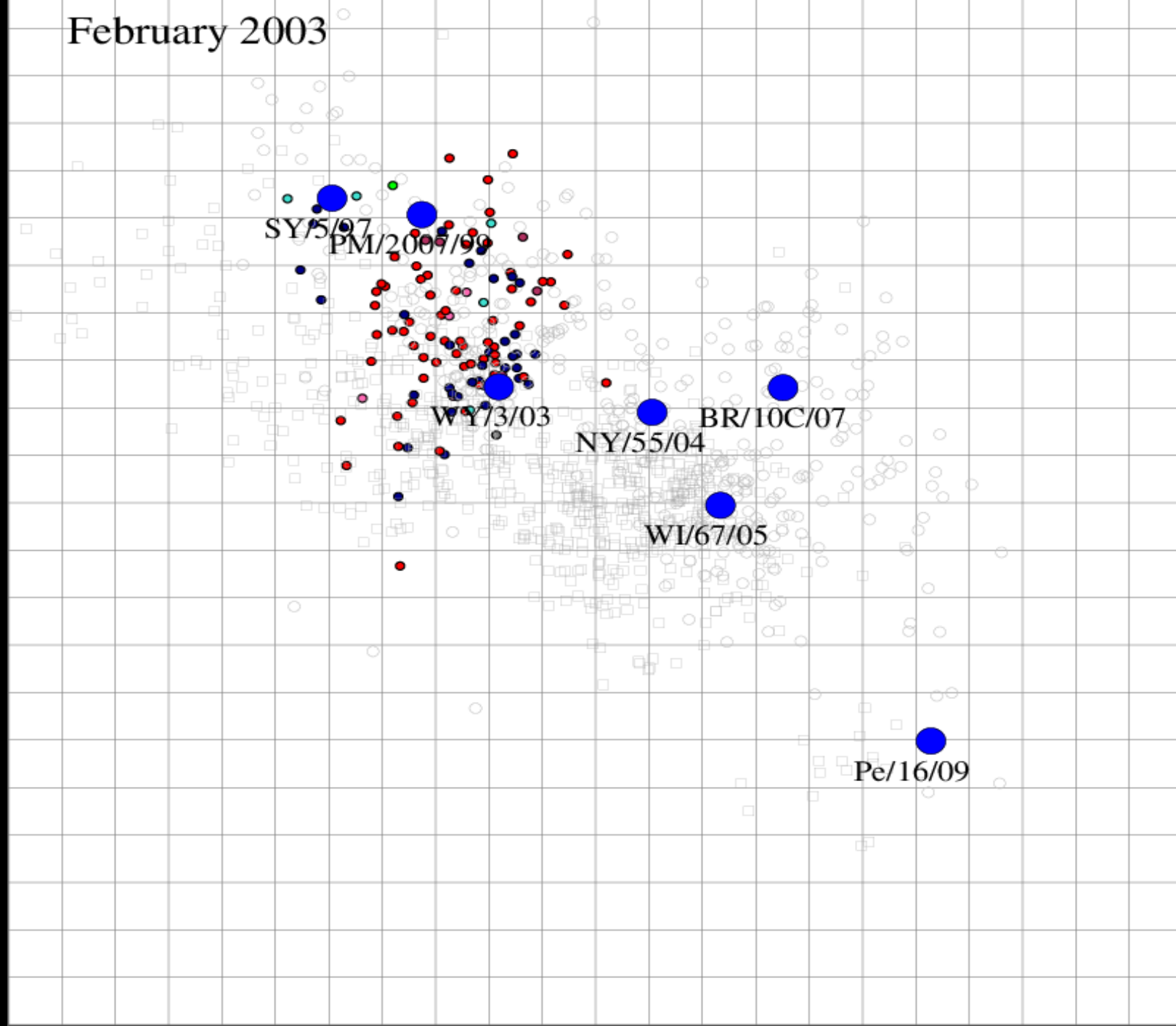
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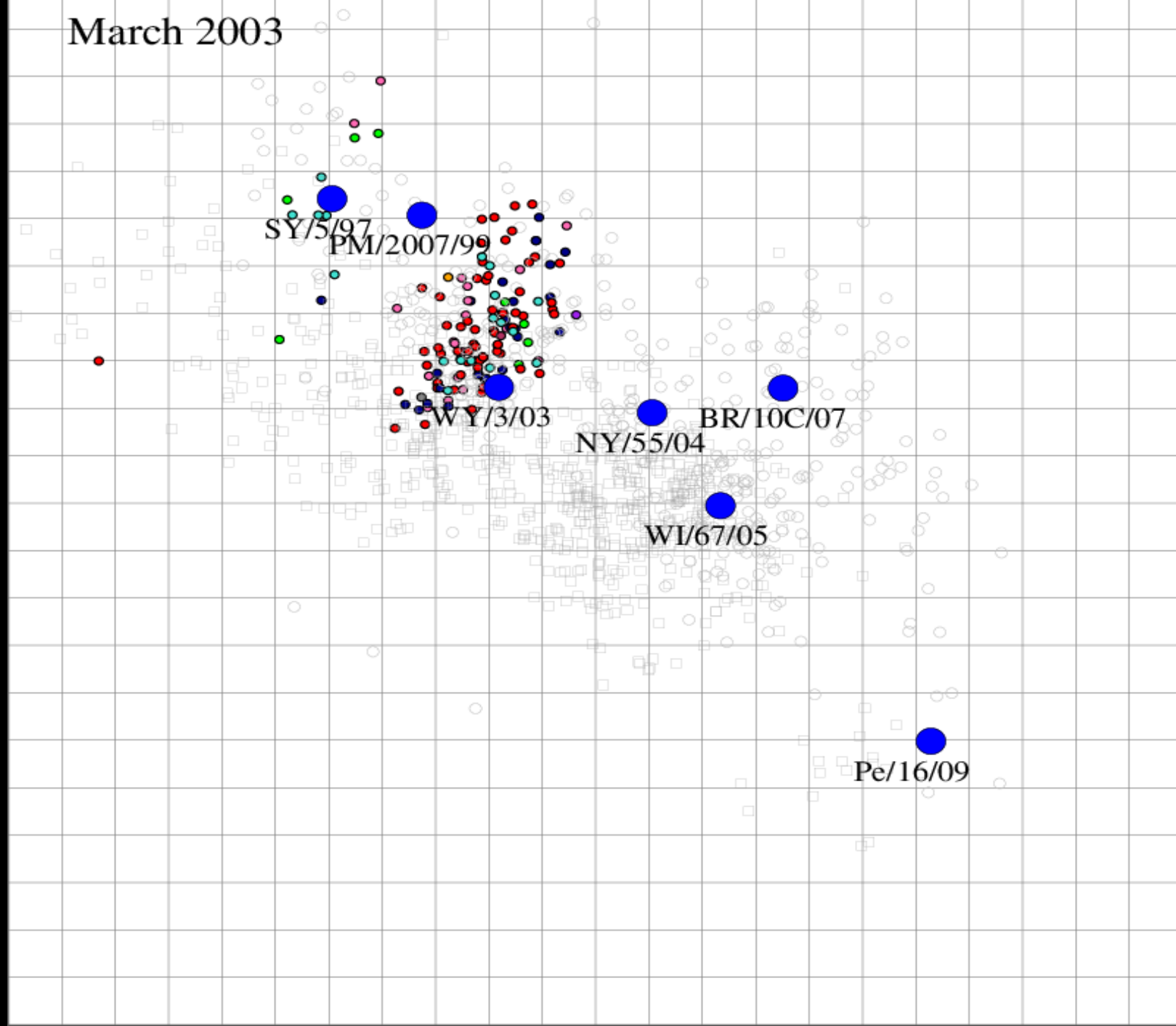
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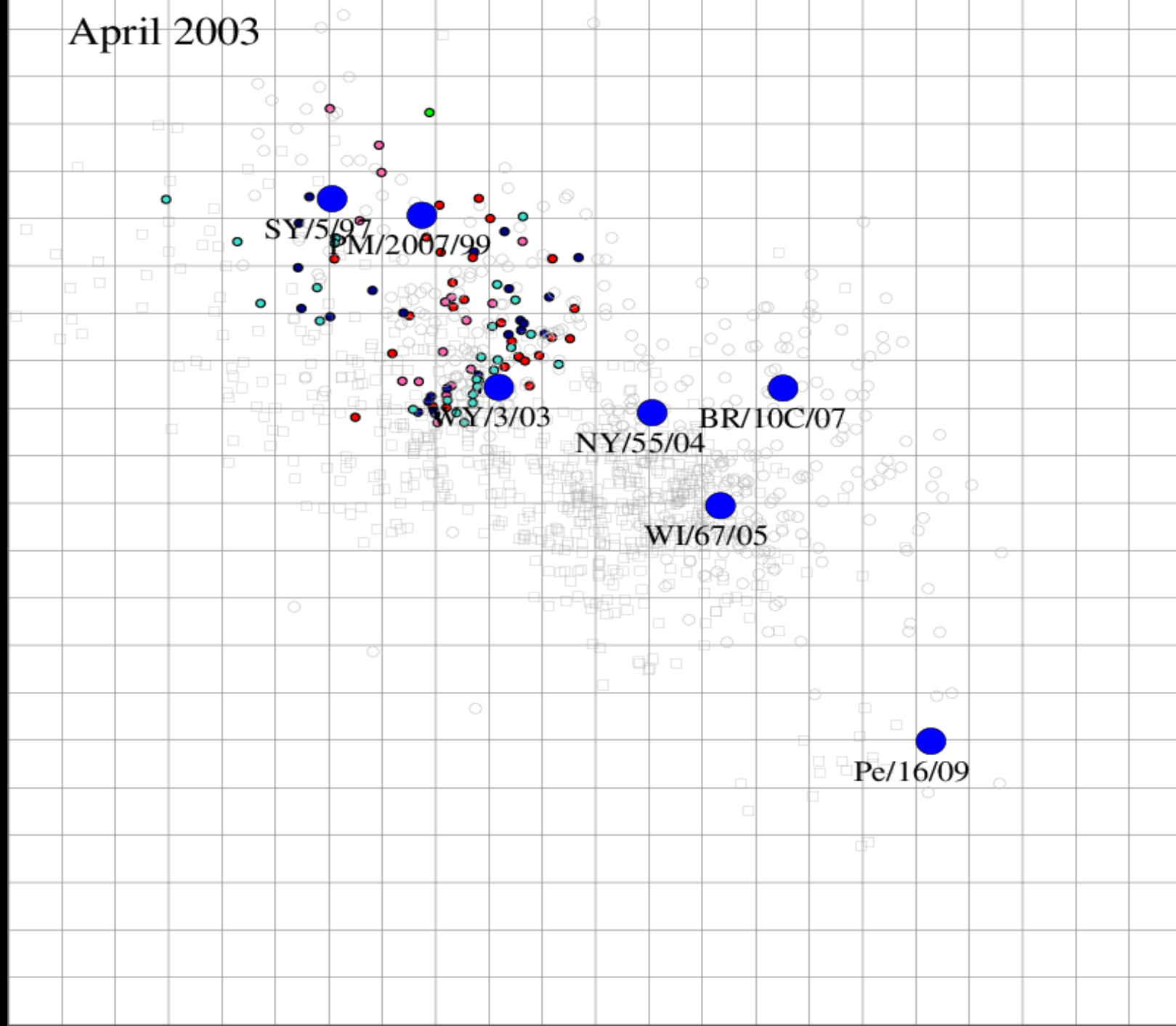
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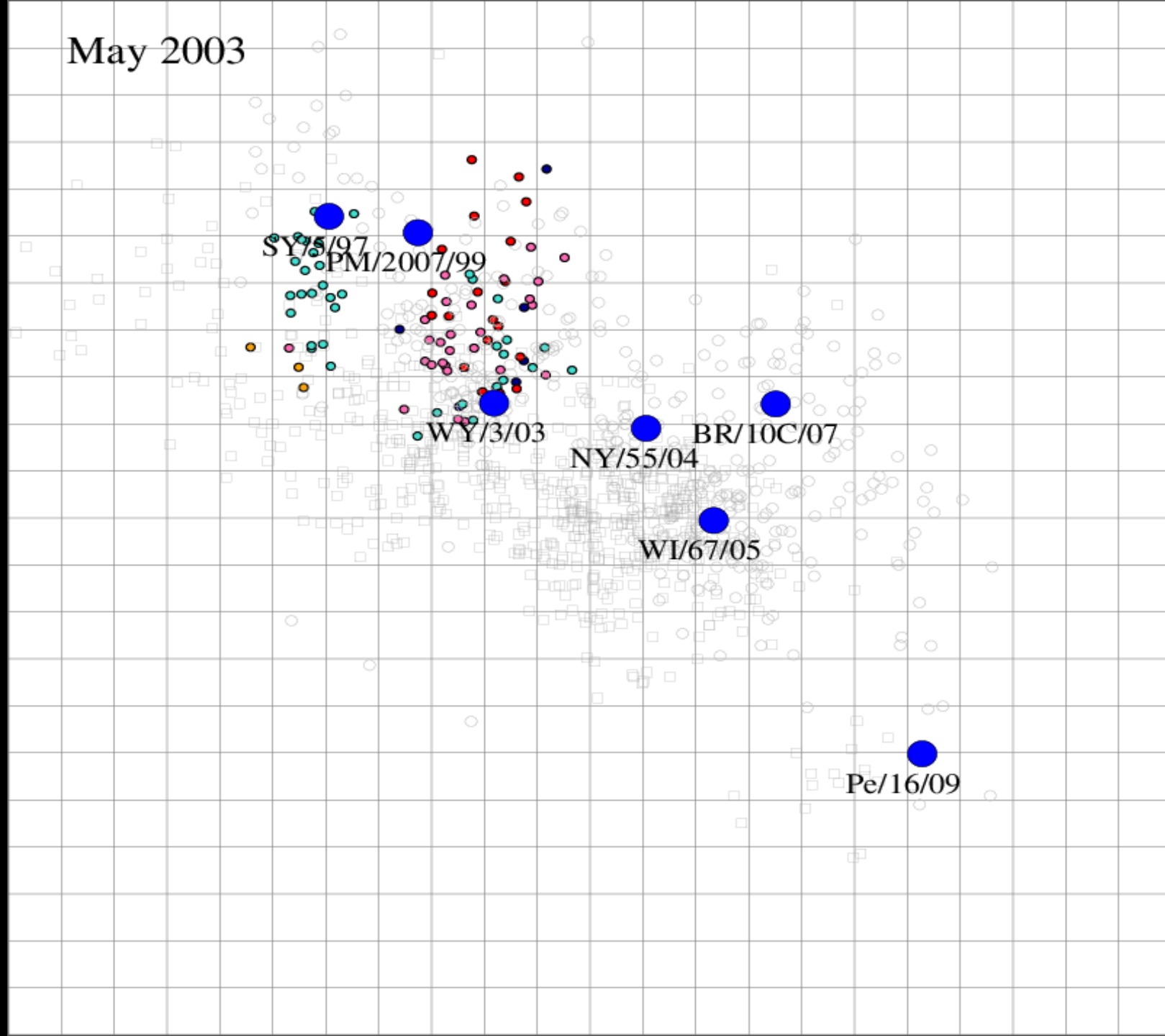
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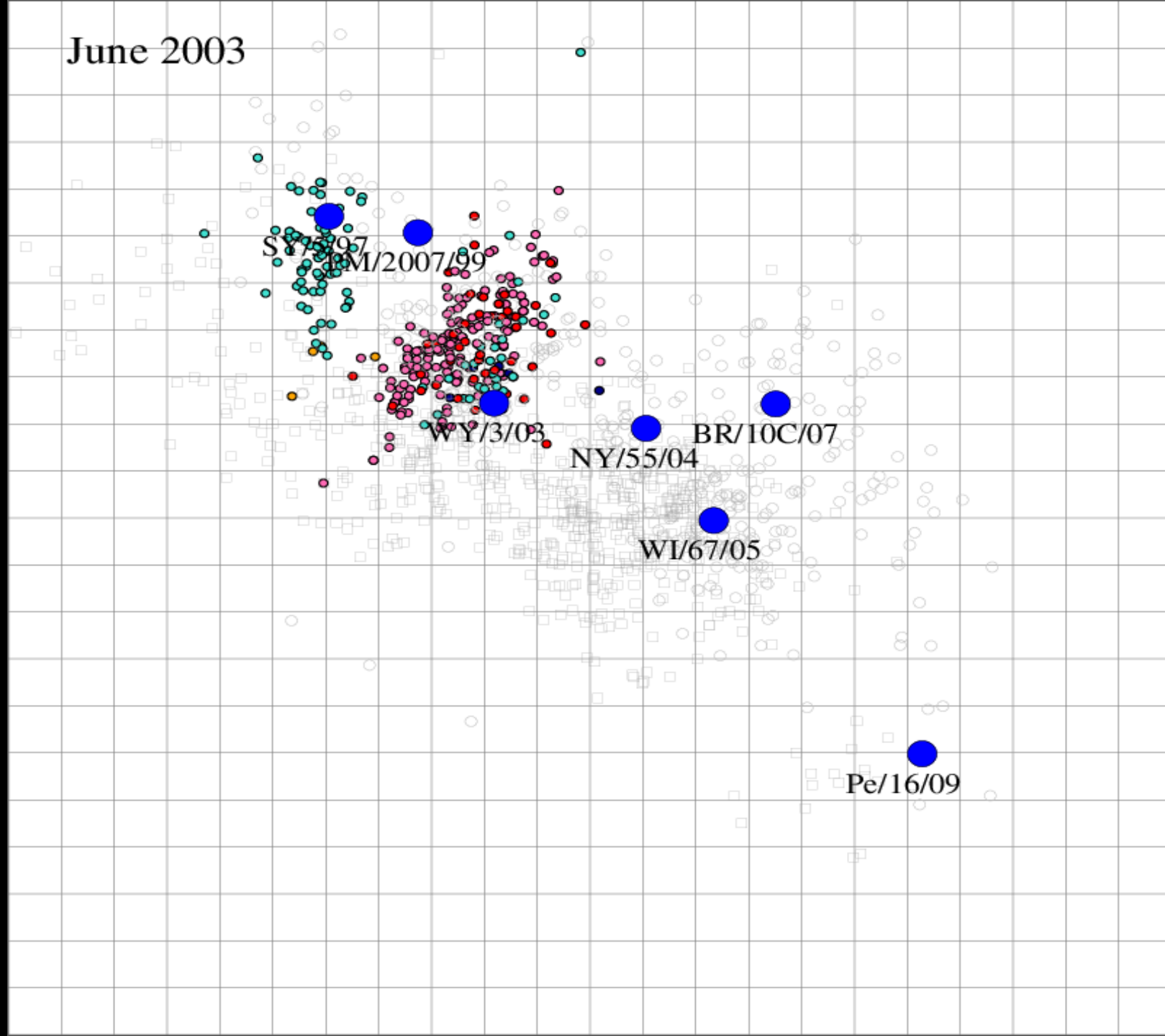
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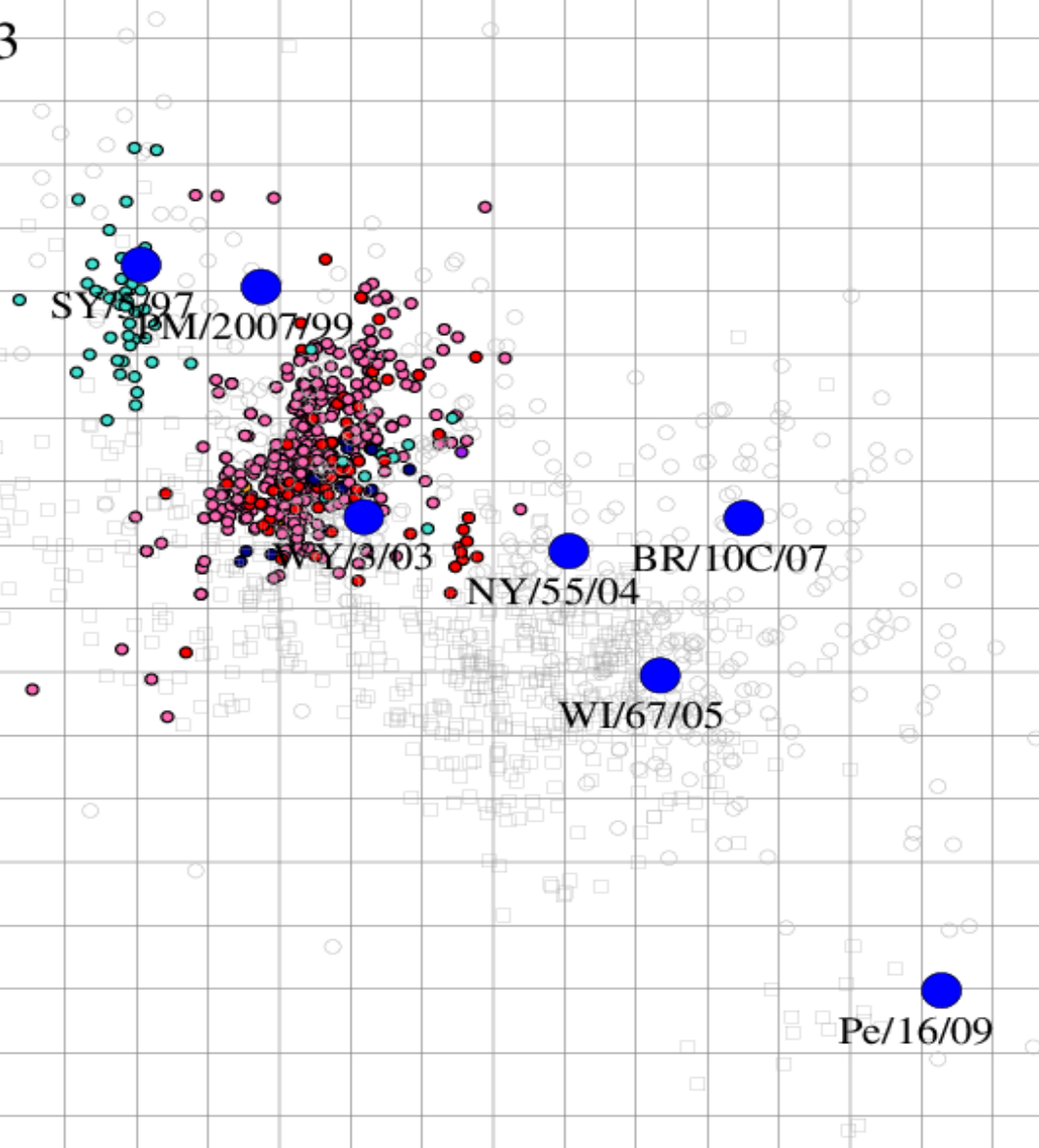
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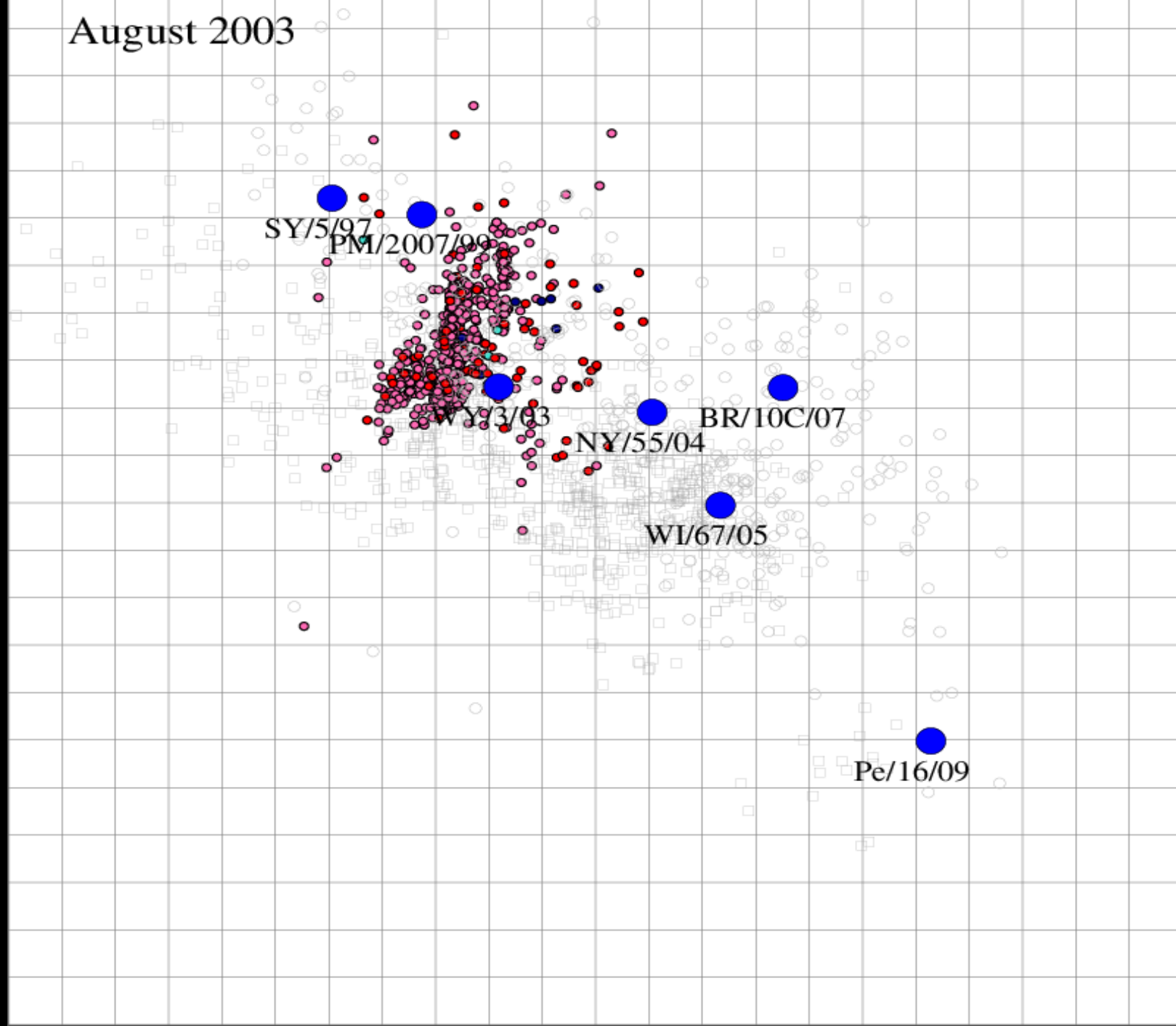
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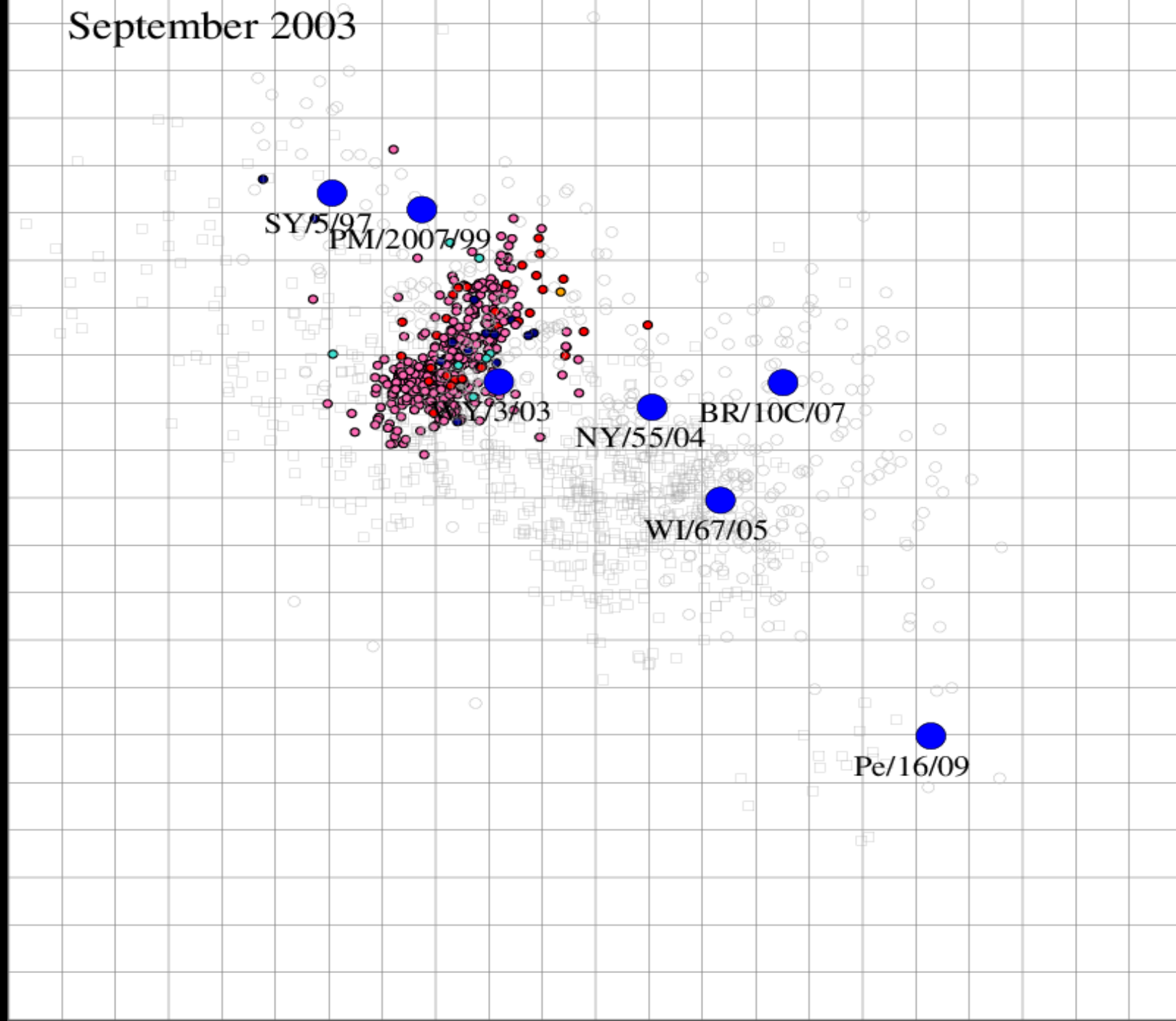
July 2003



August 2003



September 2003



October 2003

SY95/97

PM/2007/99

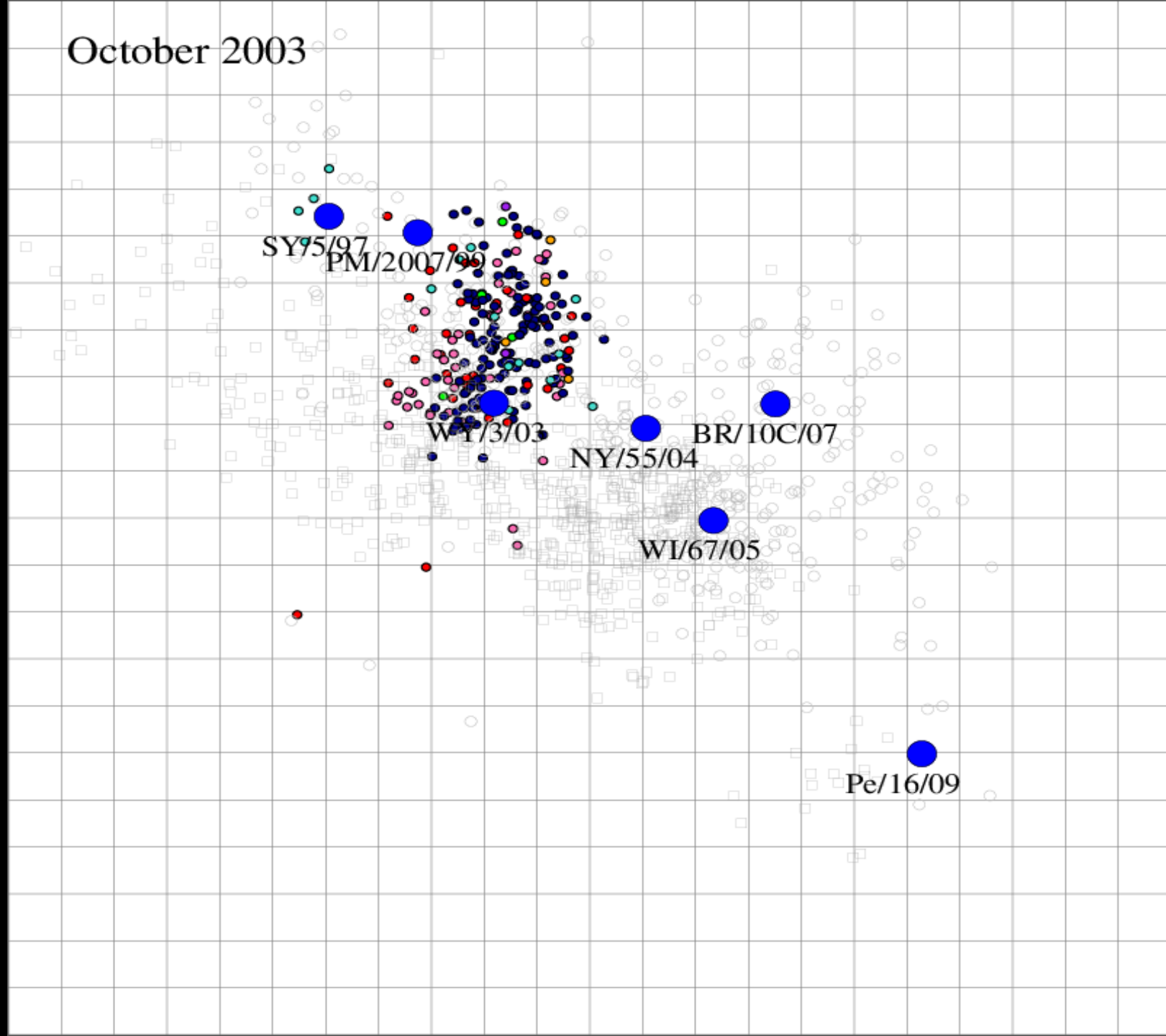
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NY/55/04

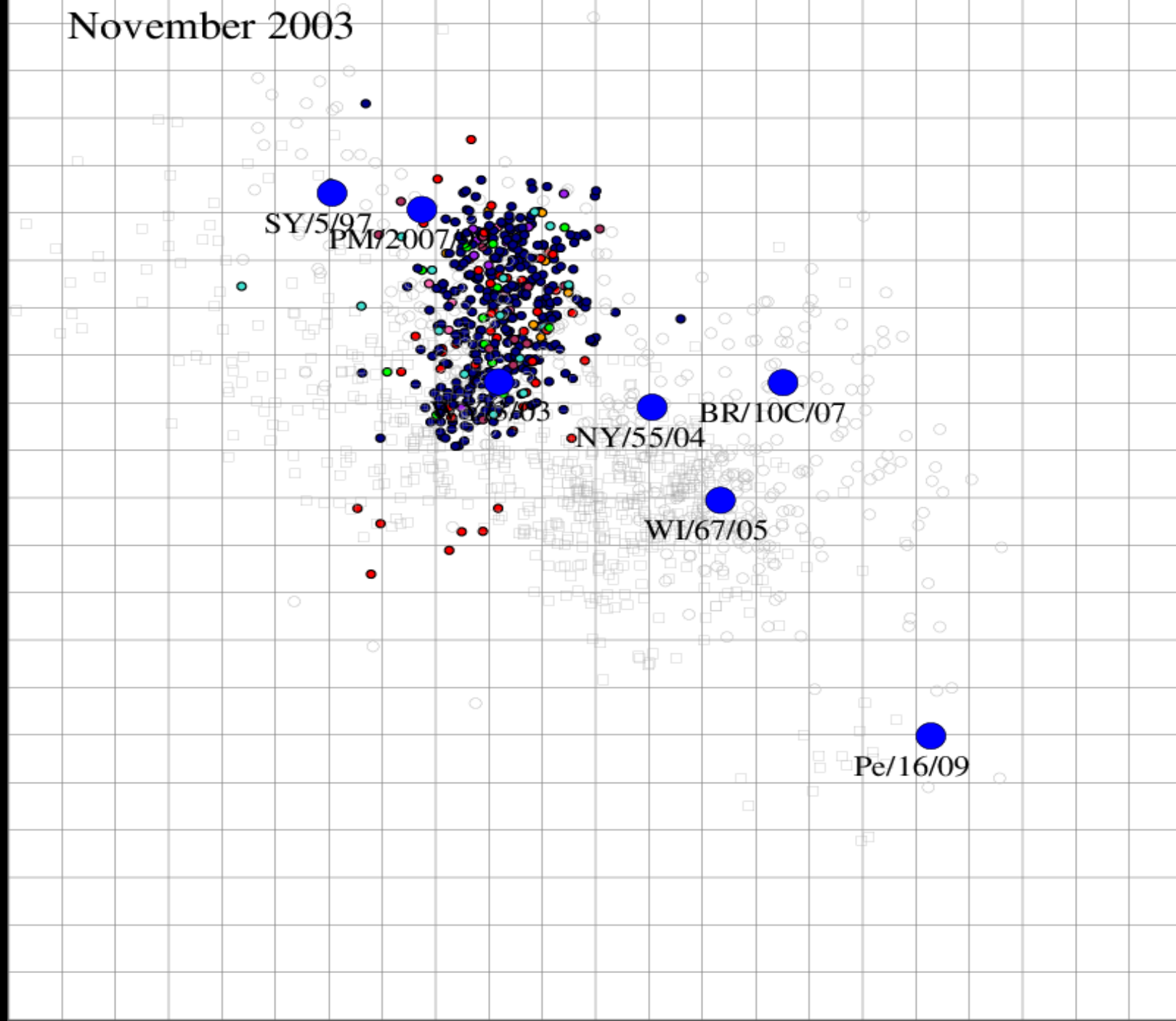
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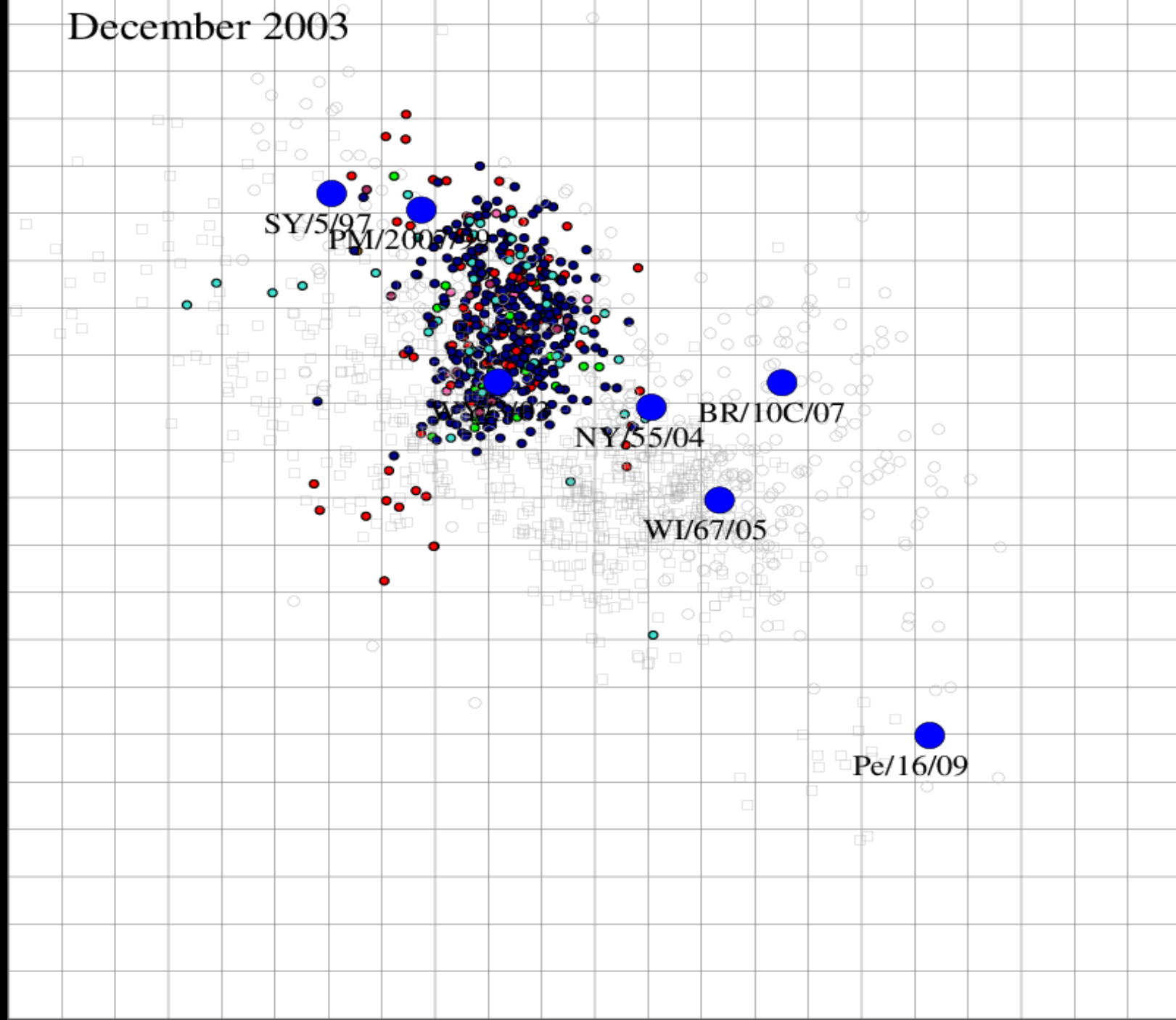
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November 2003



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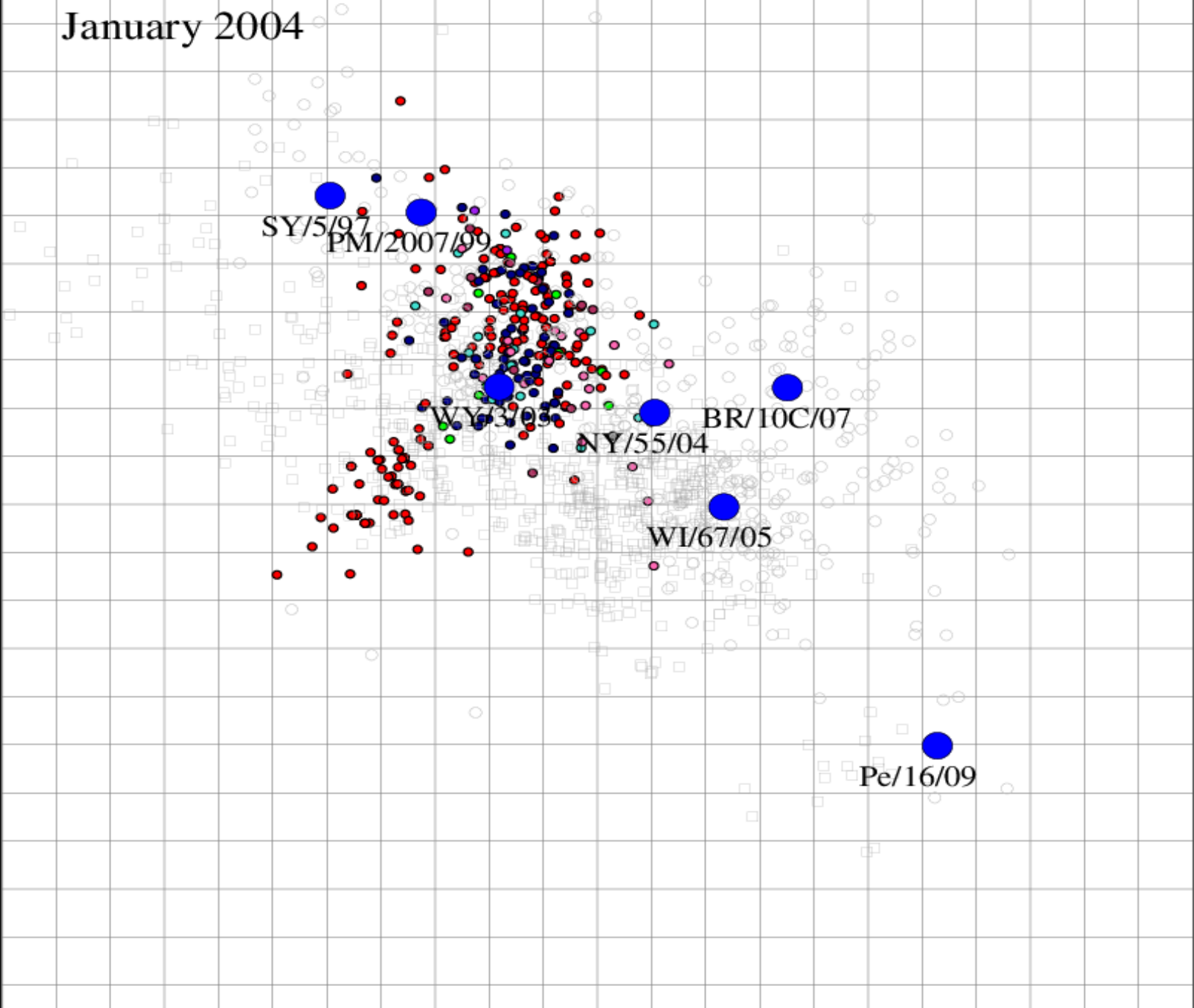
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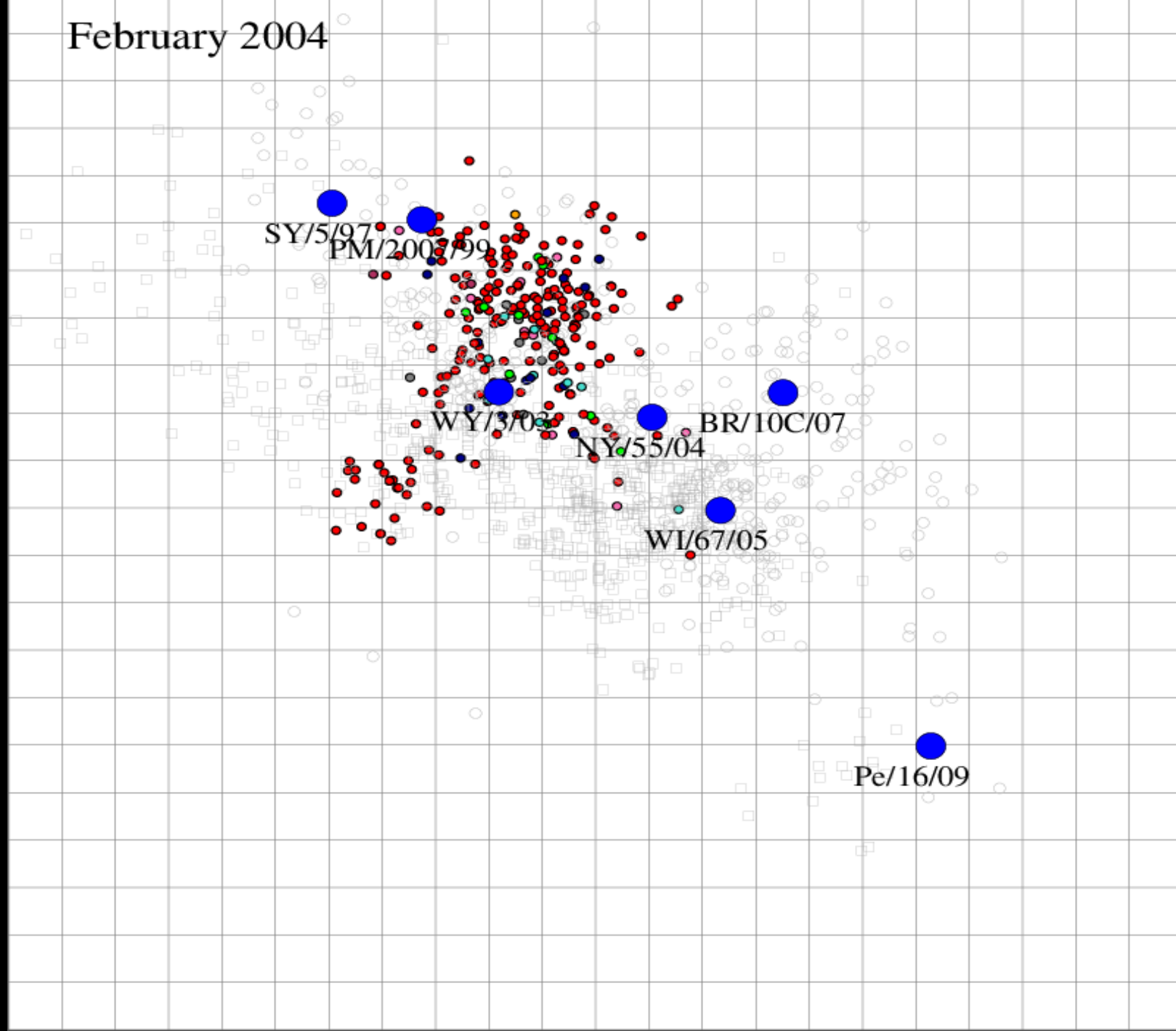
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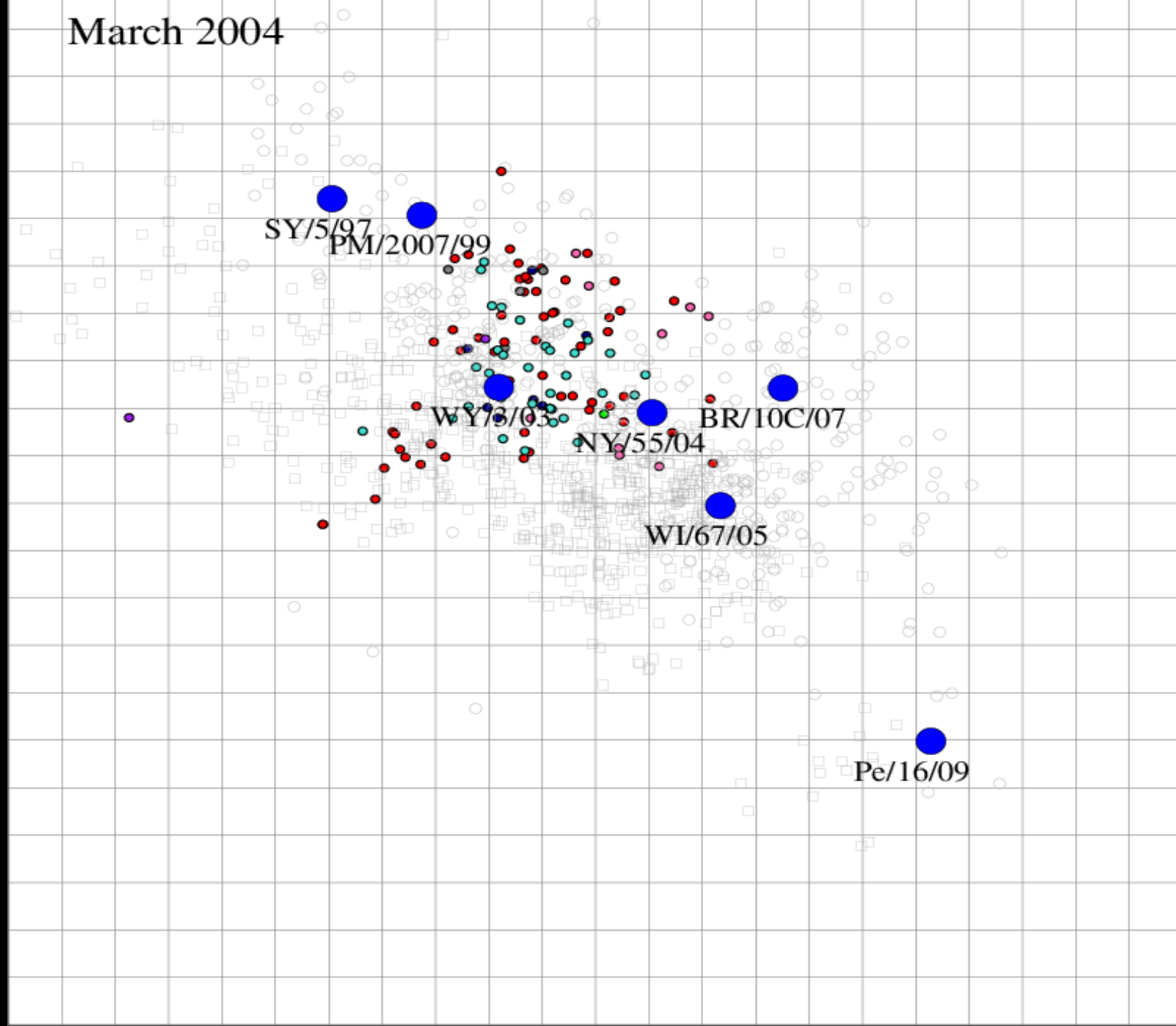
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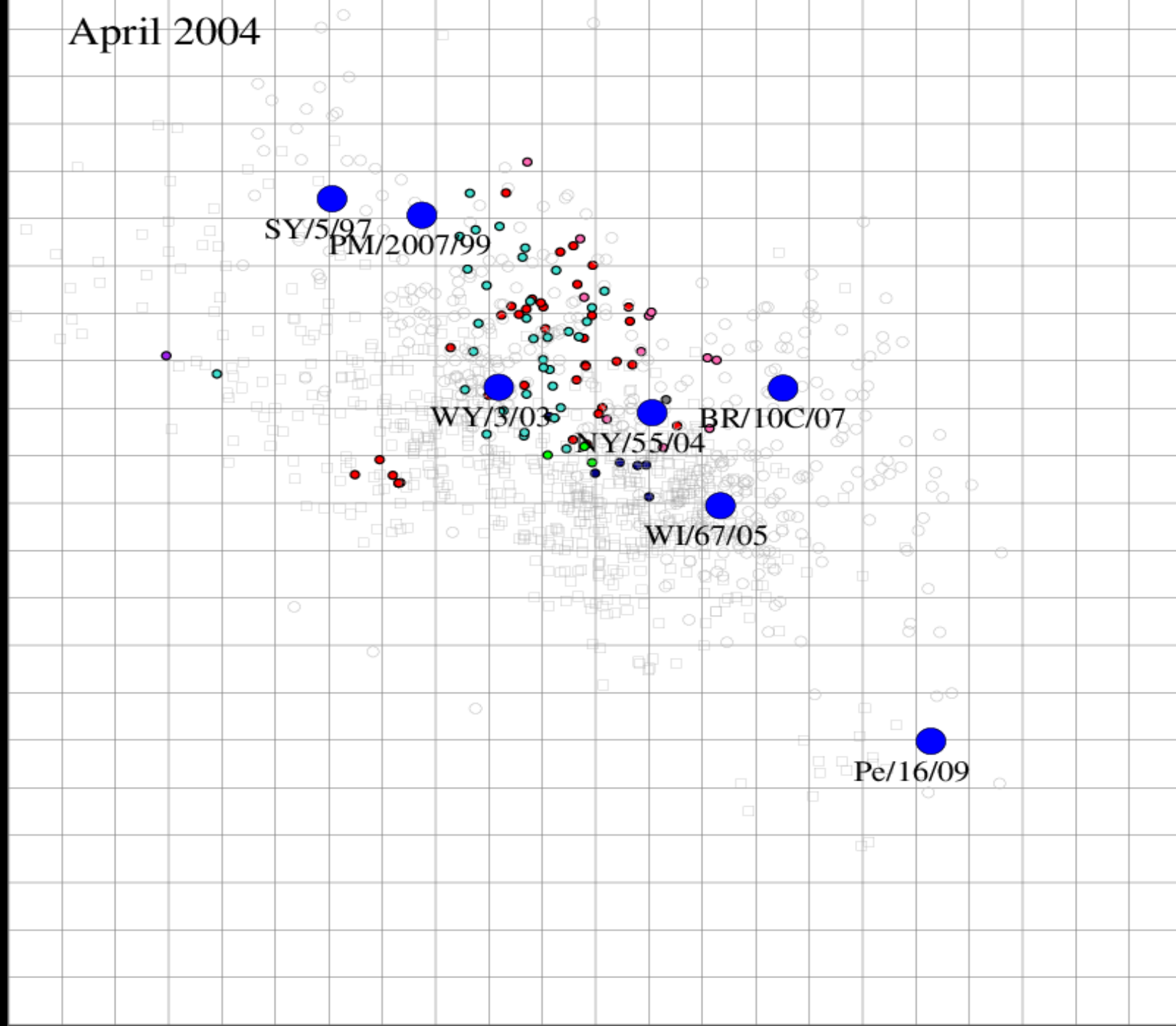
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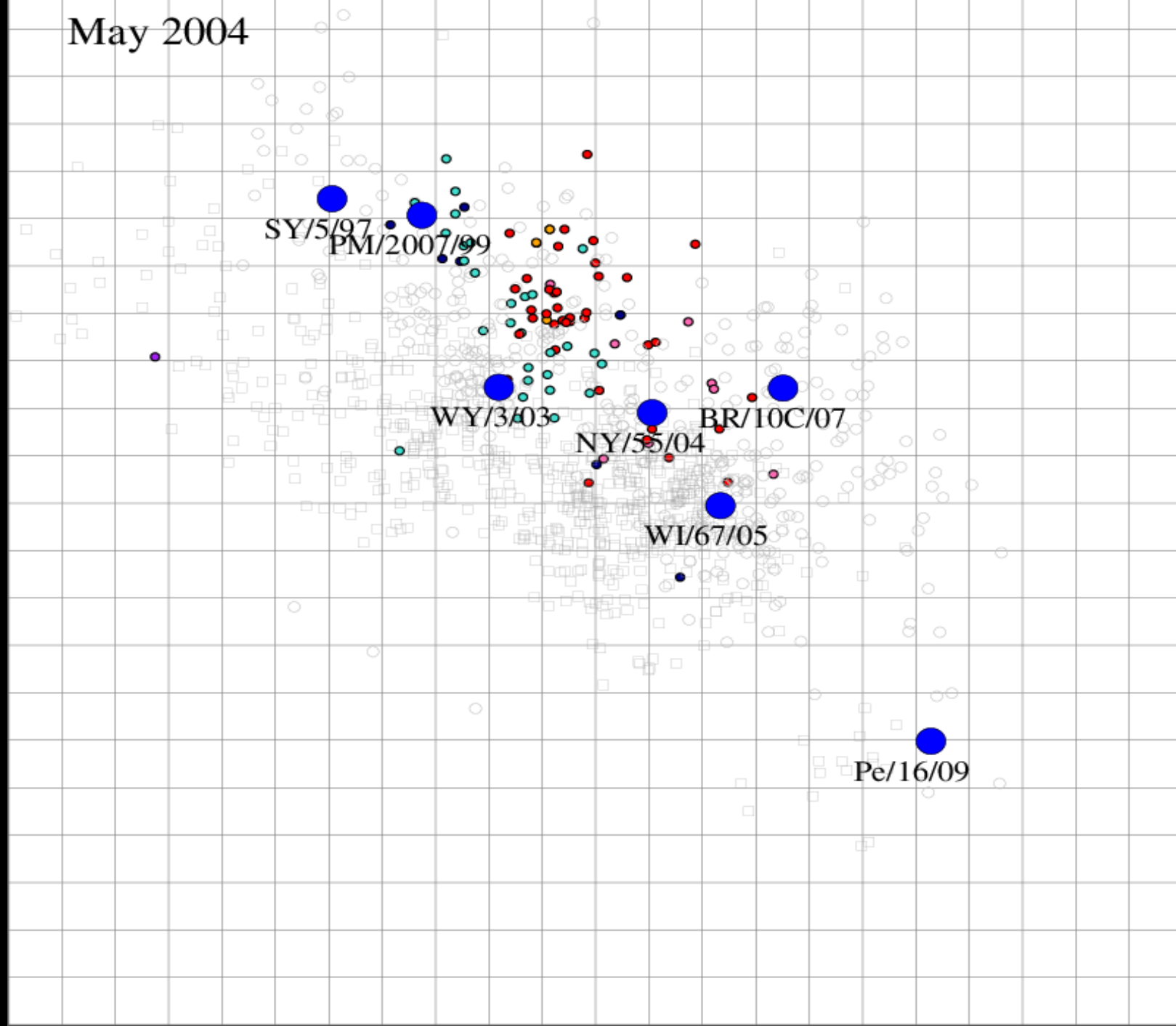
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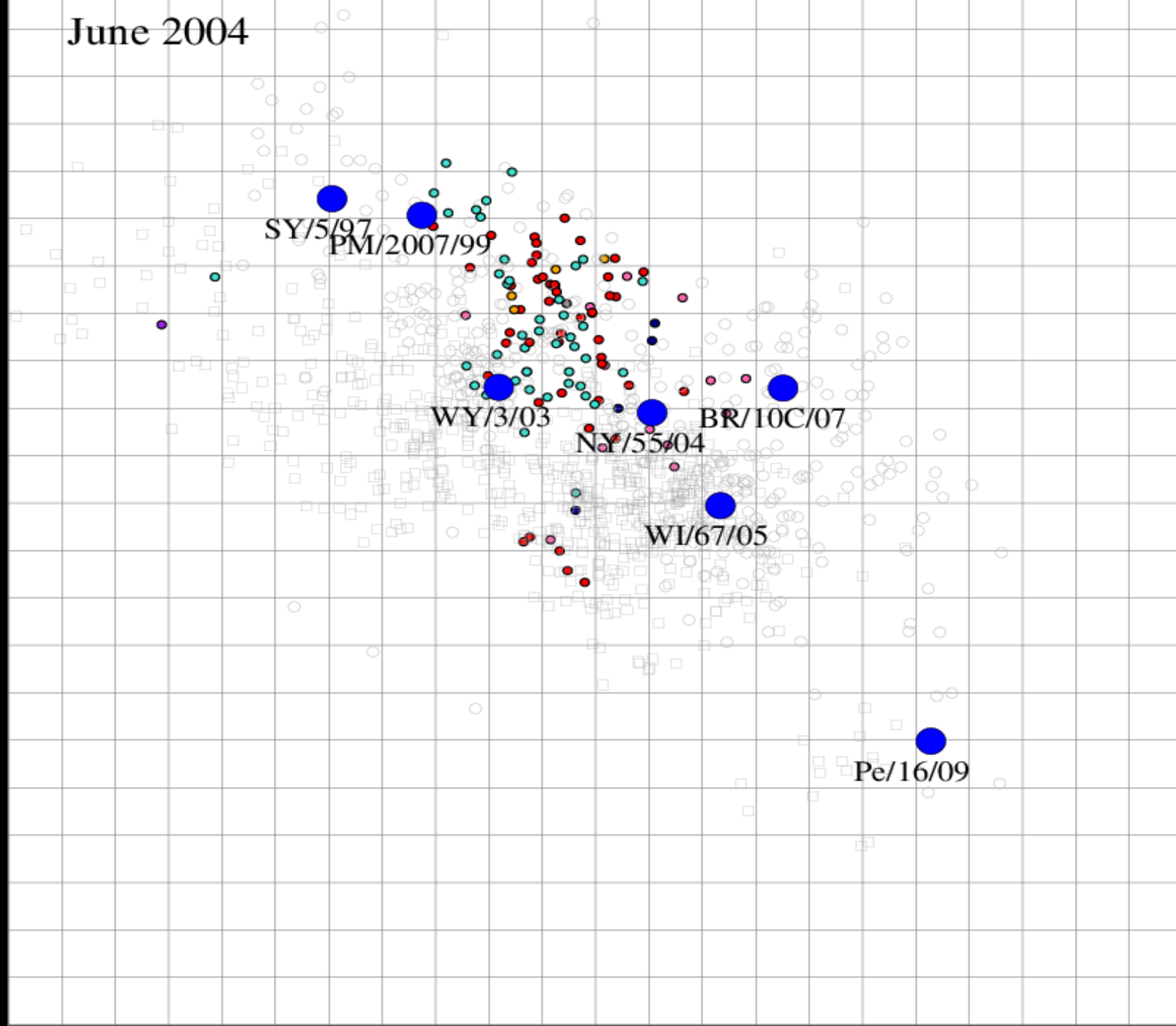
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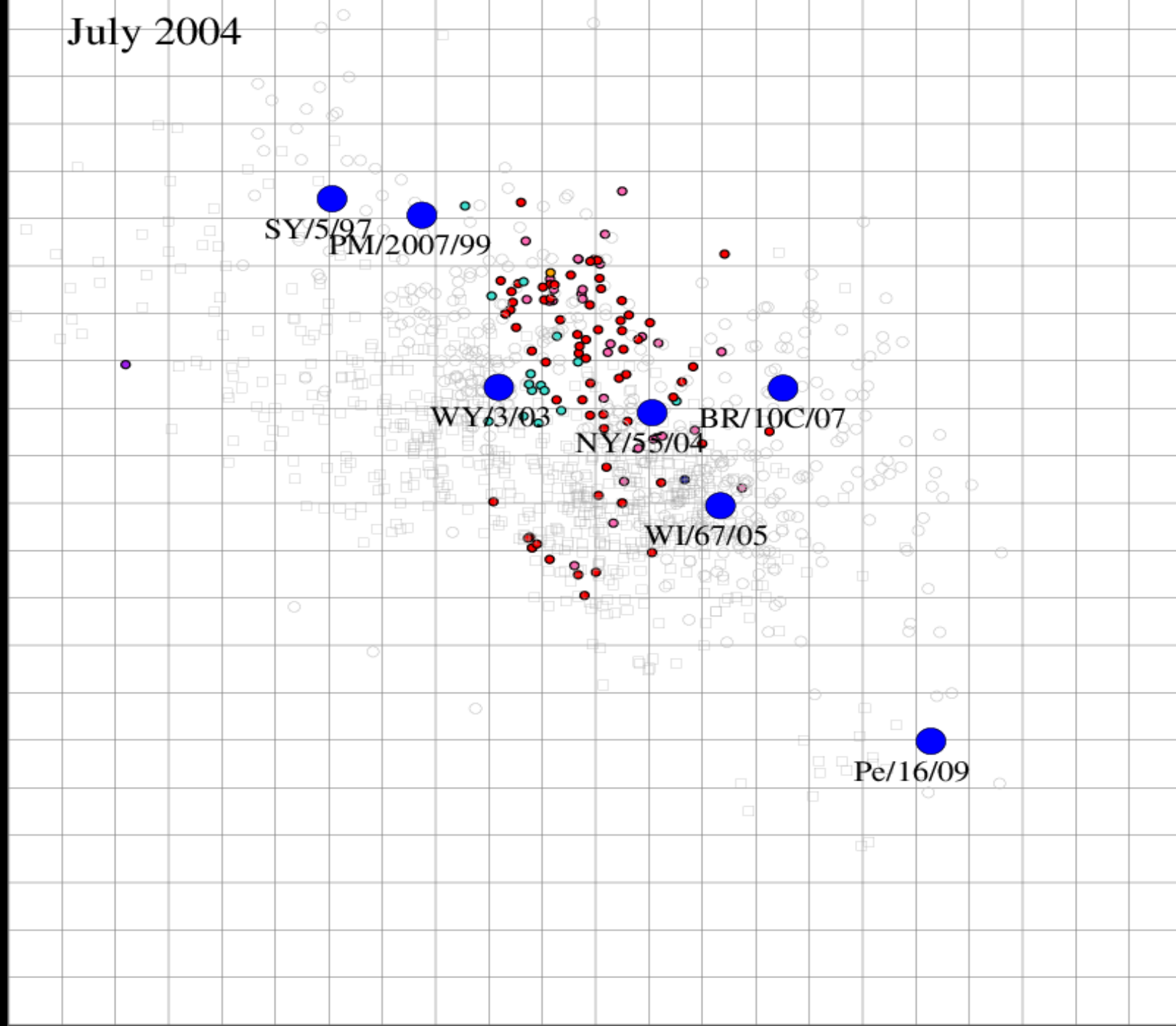
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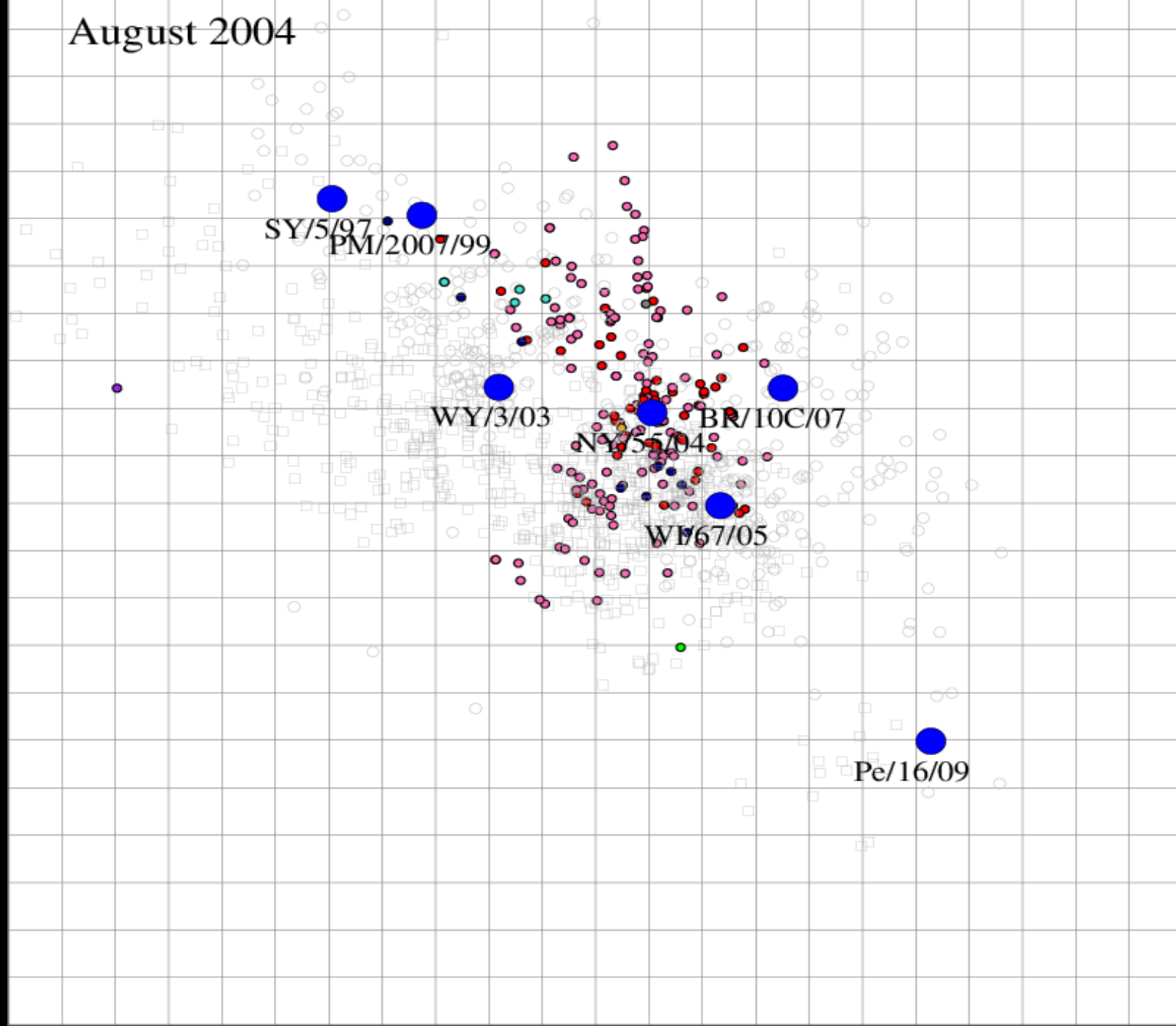
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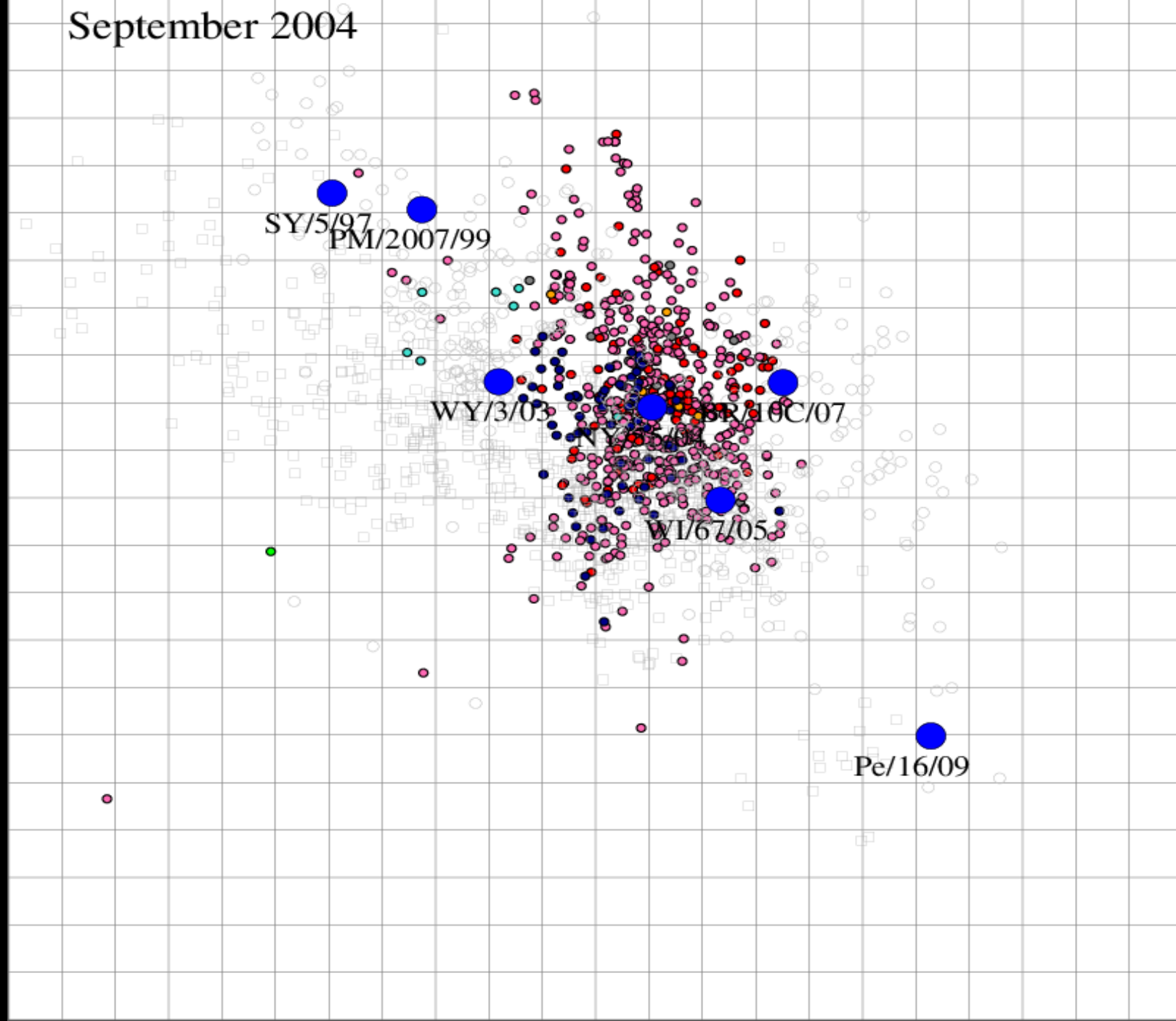
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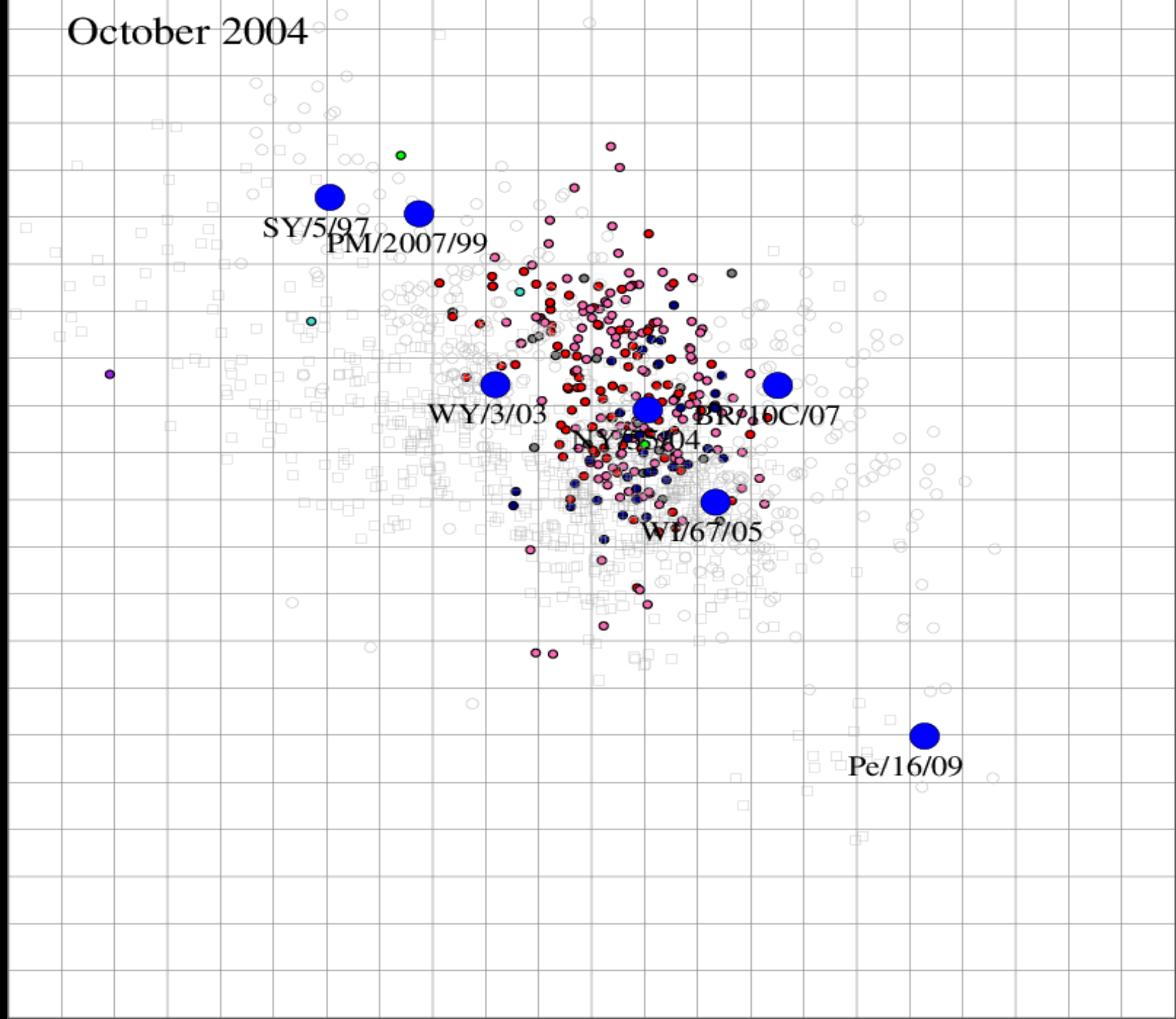
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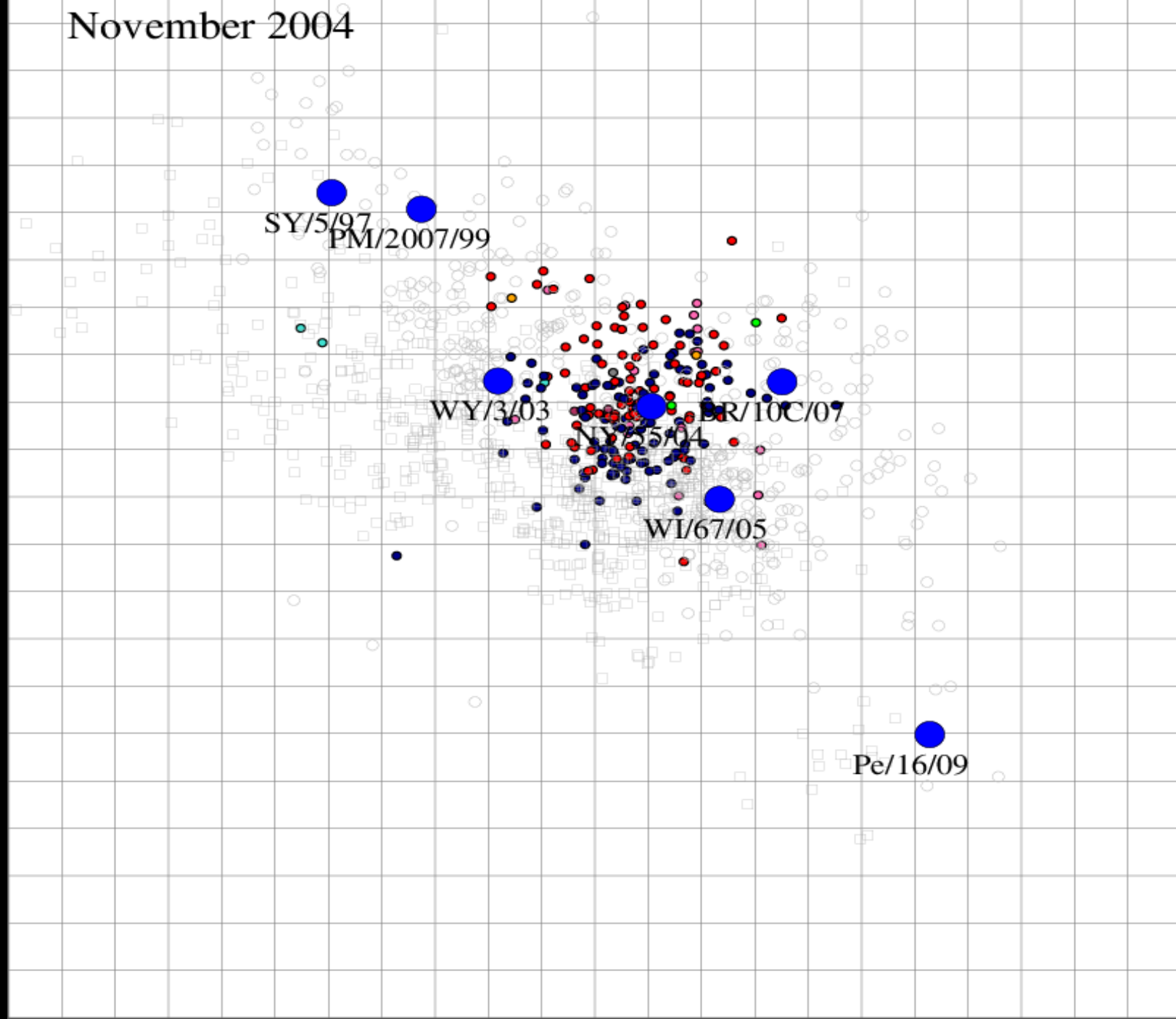
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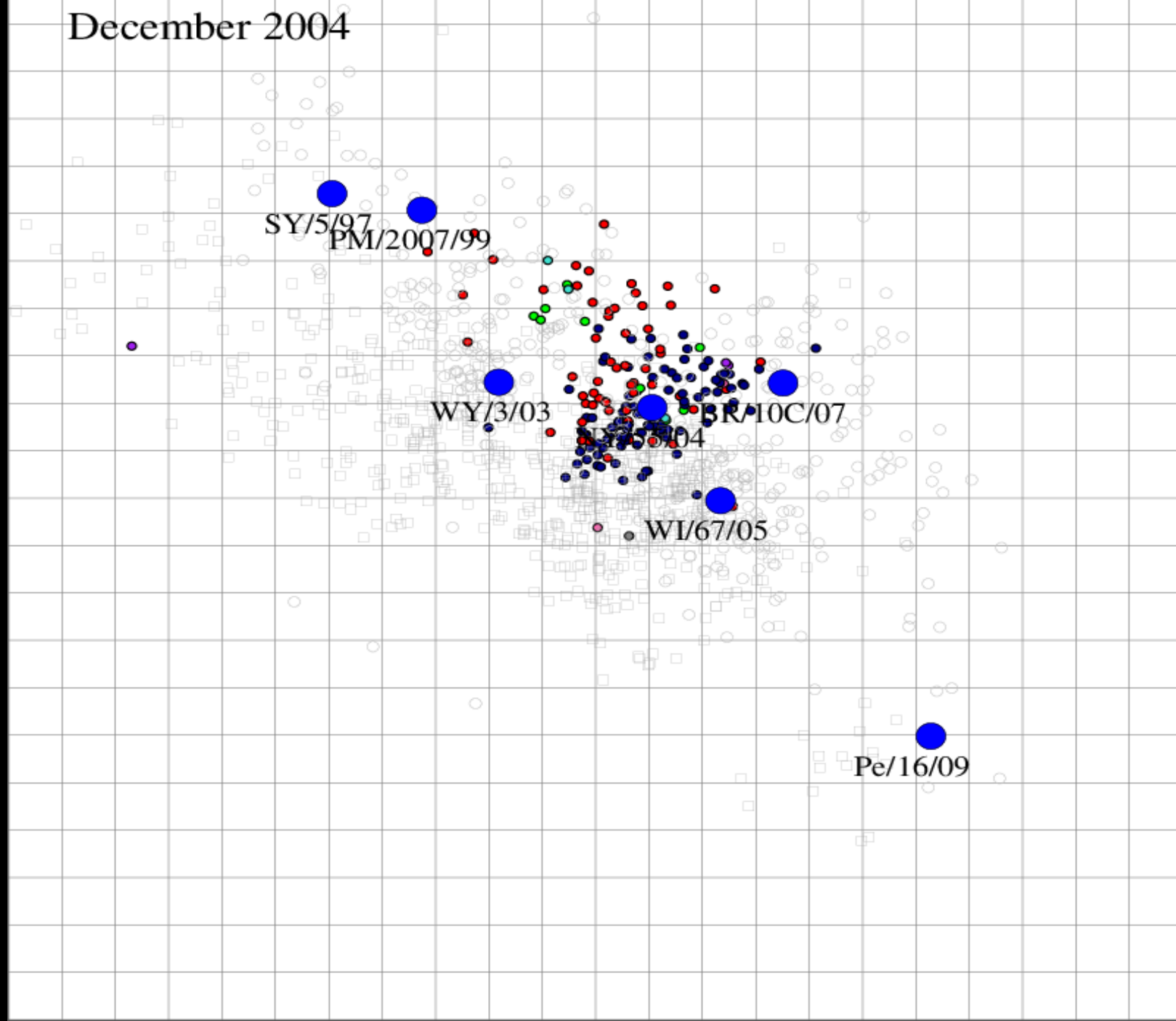
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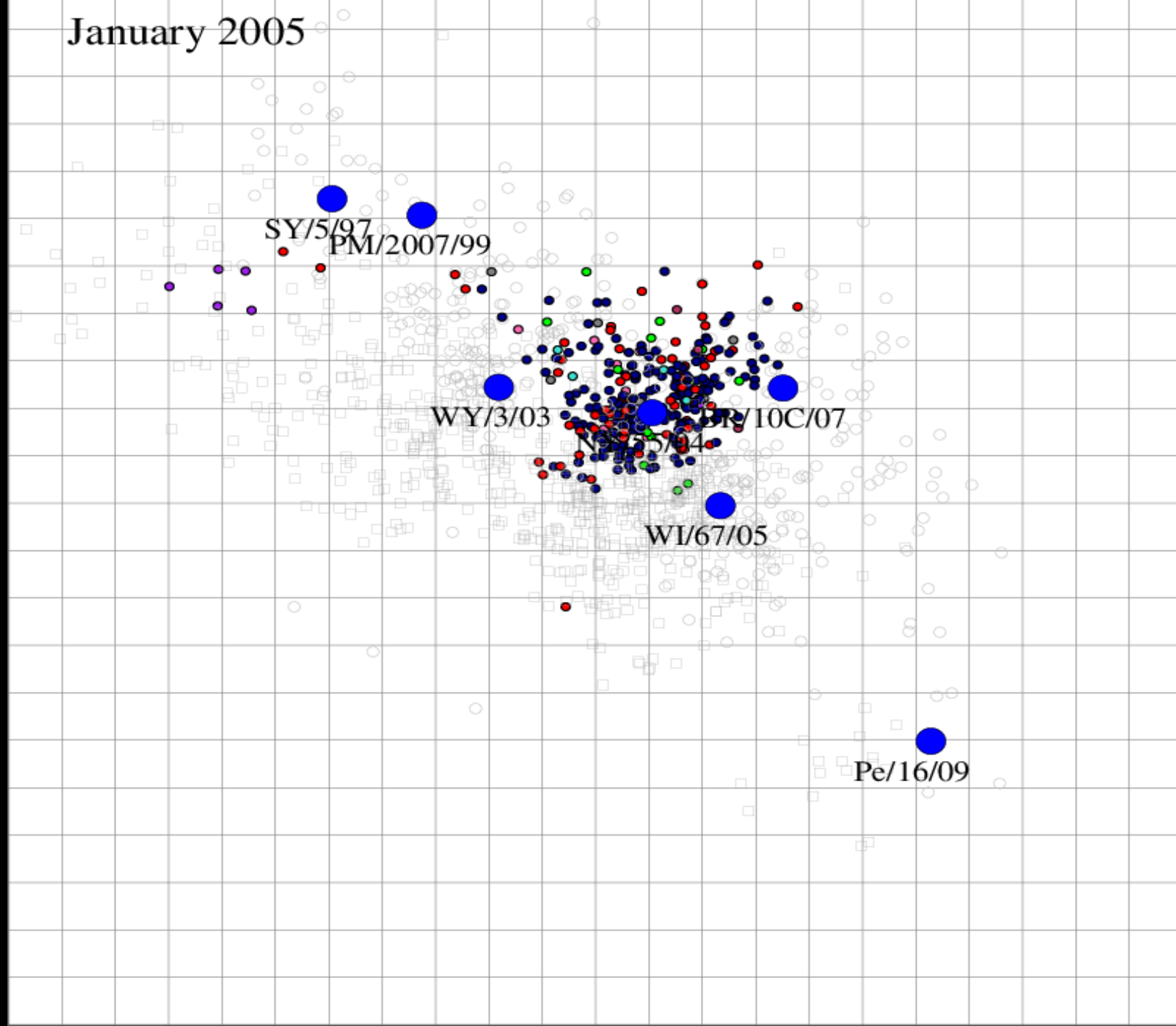
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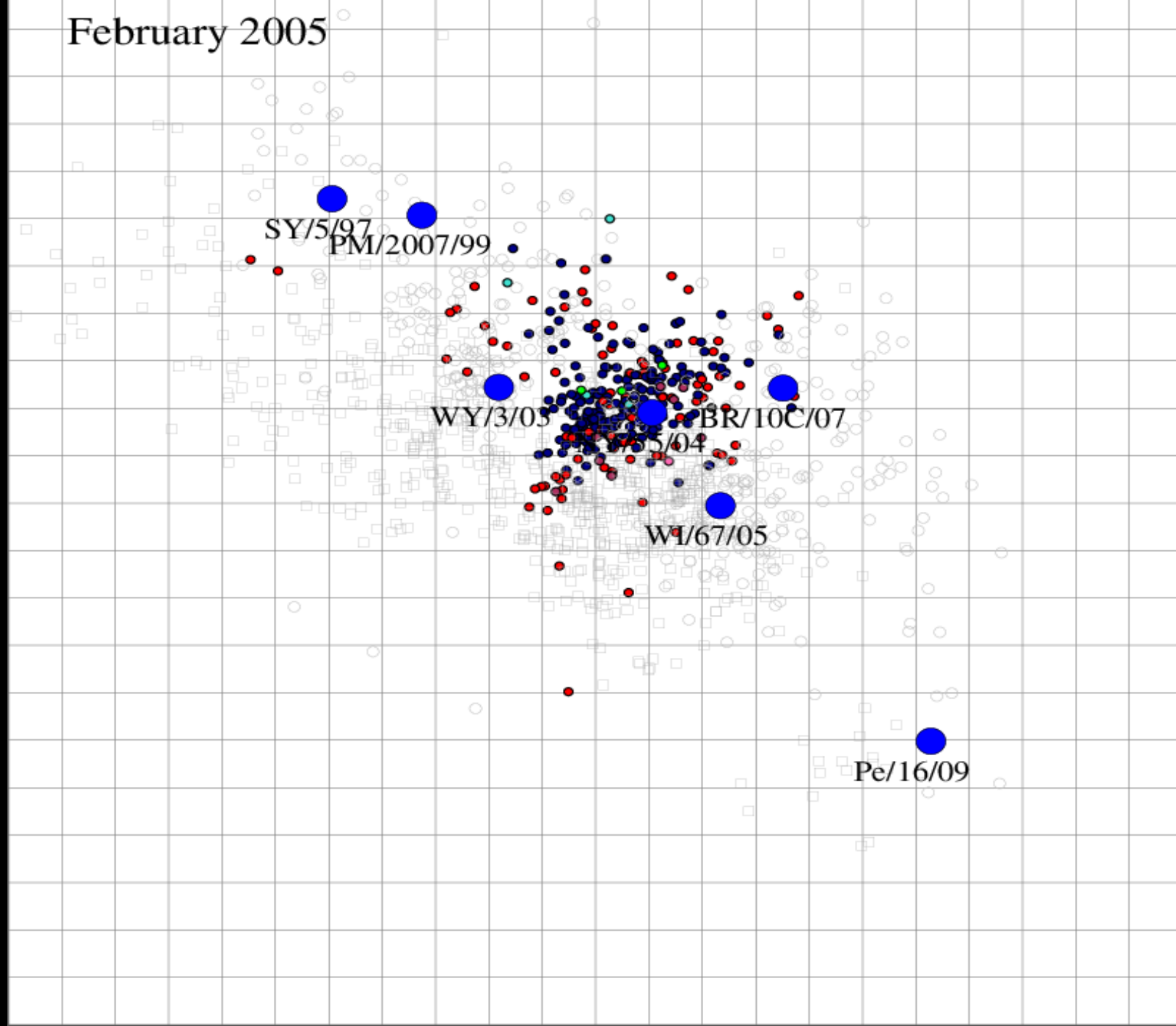
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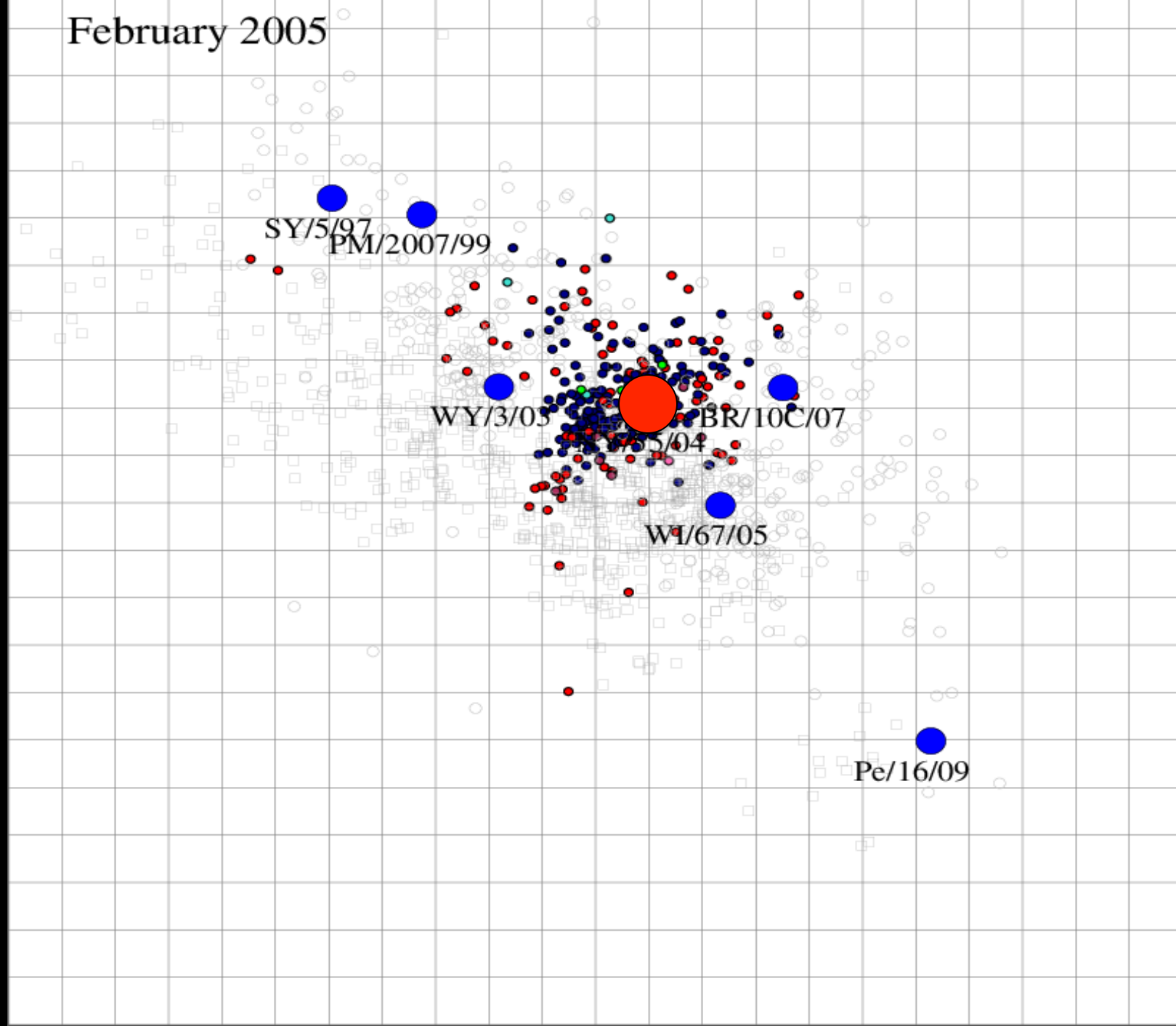
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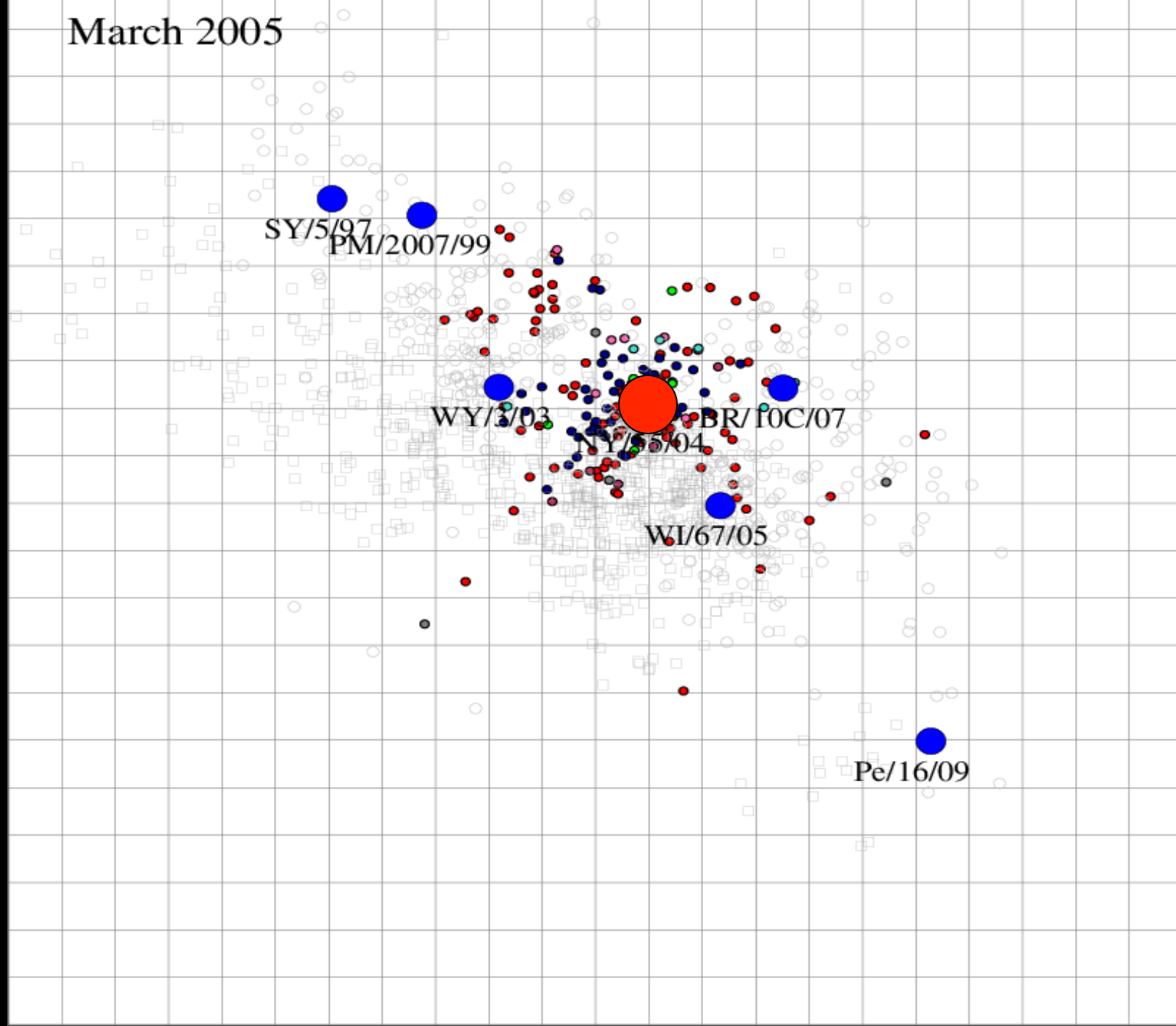
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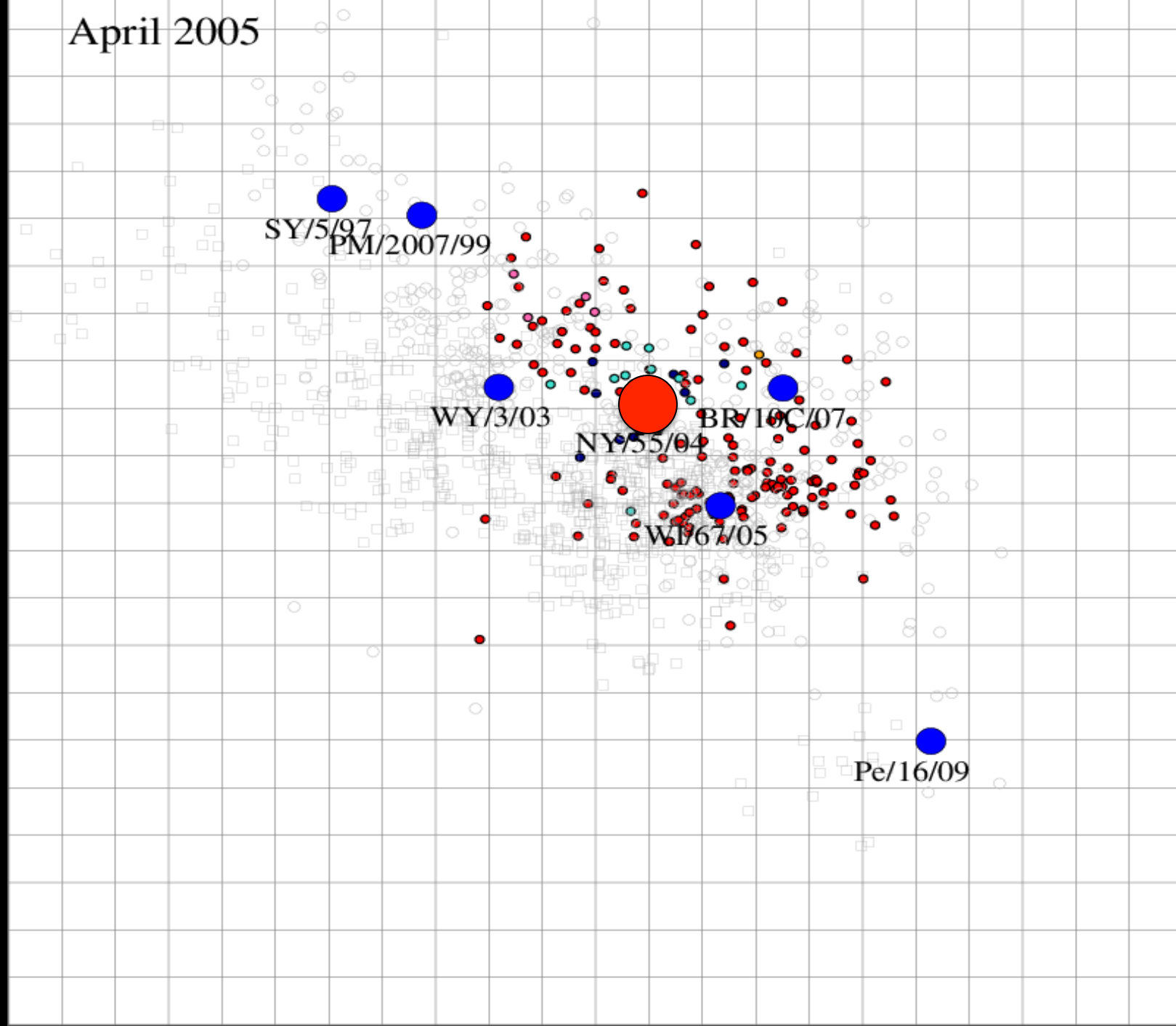
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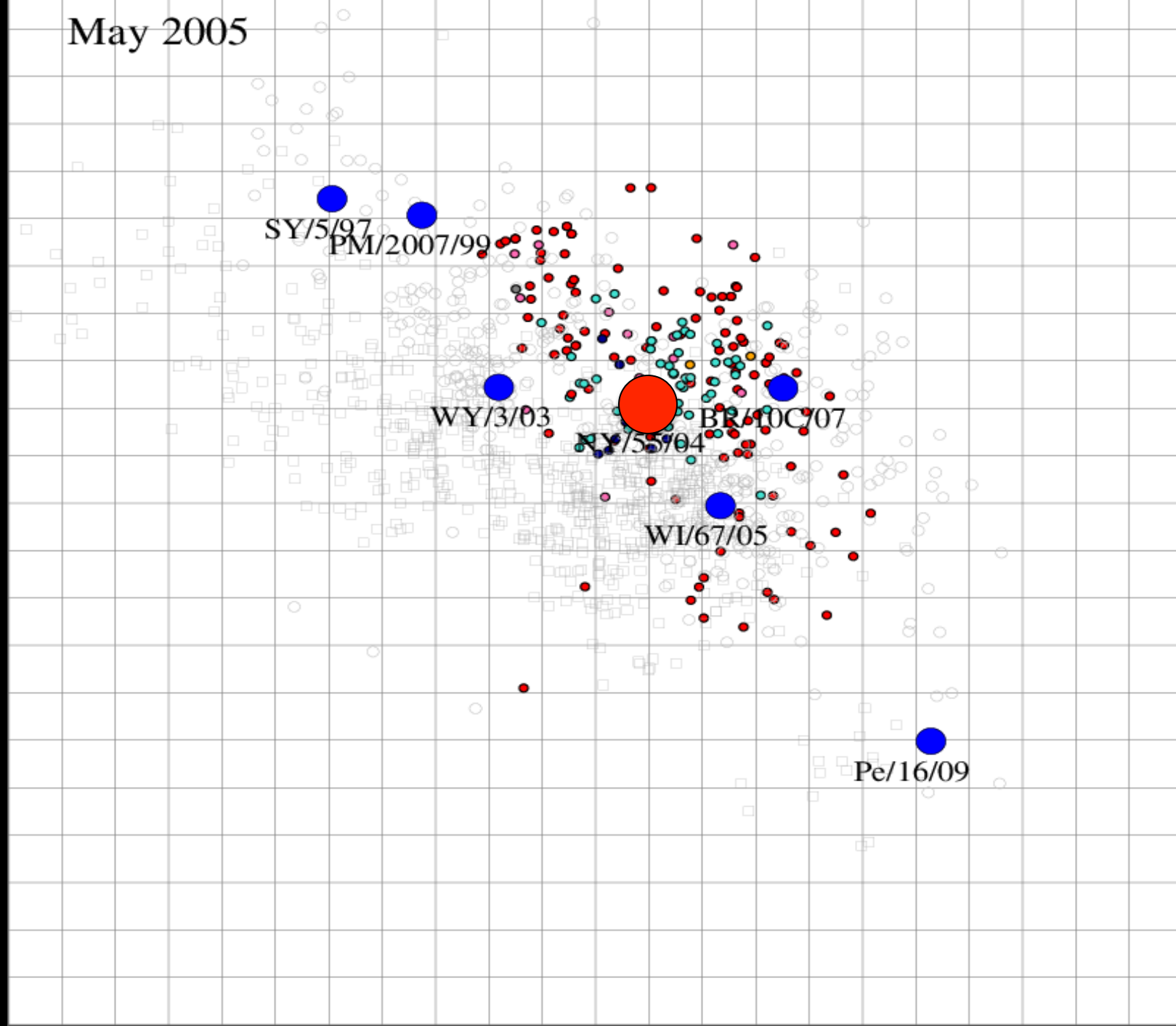
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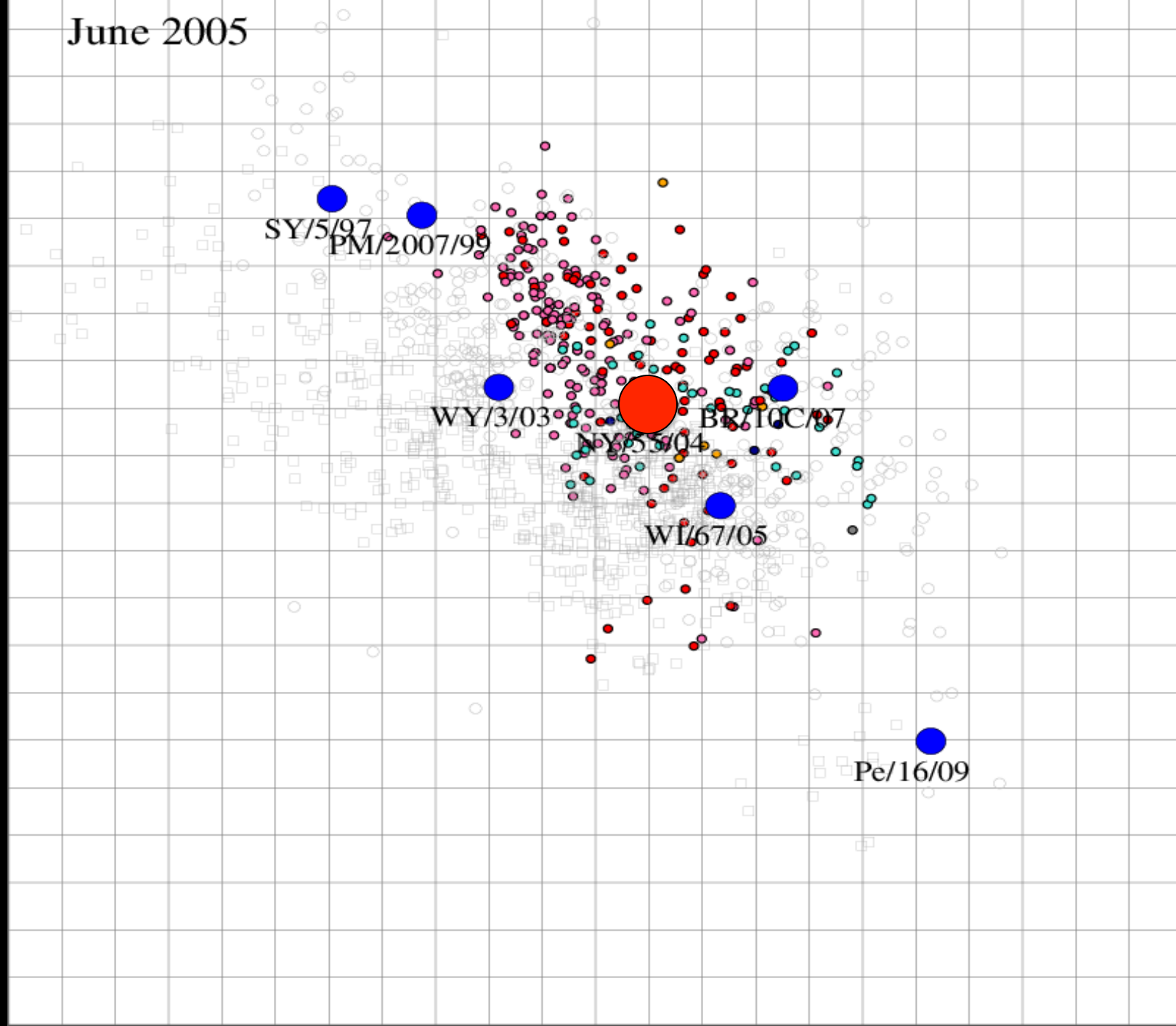
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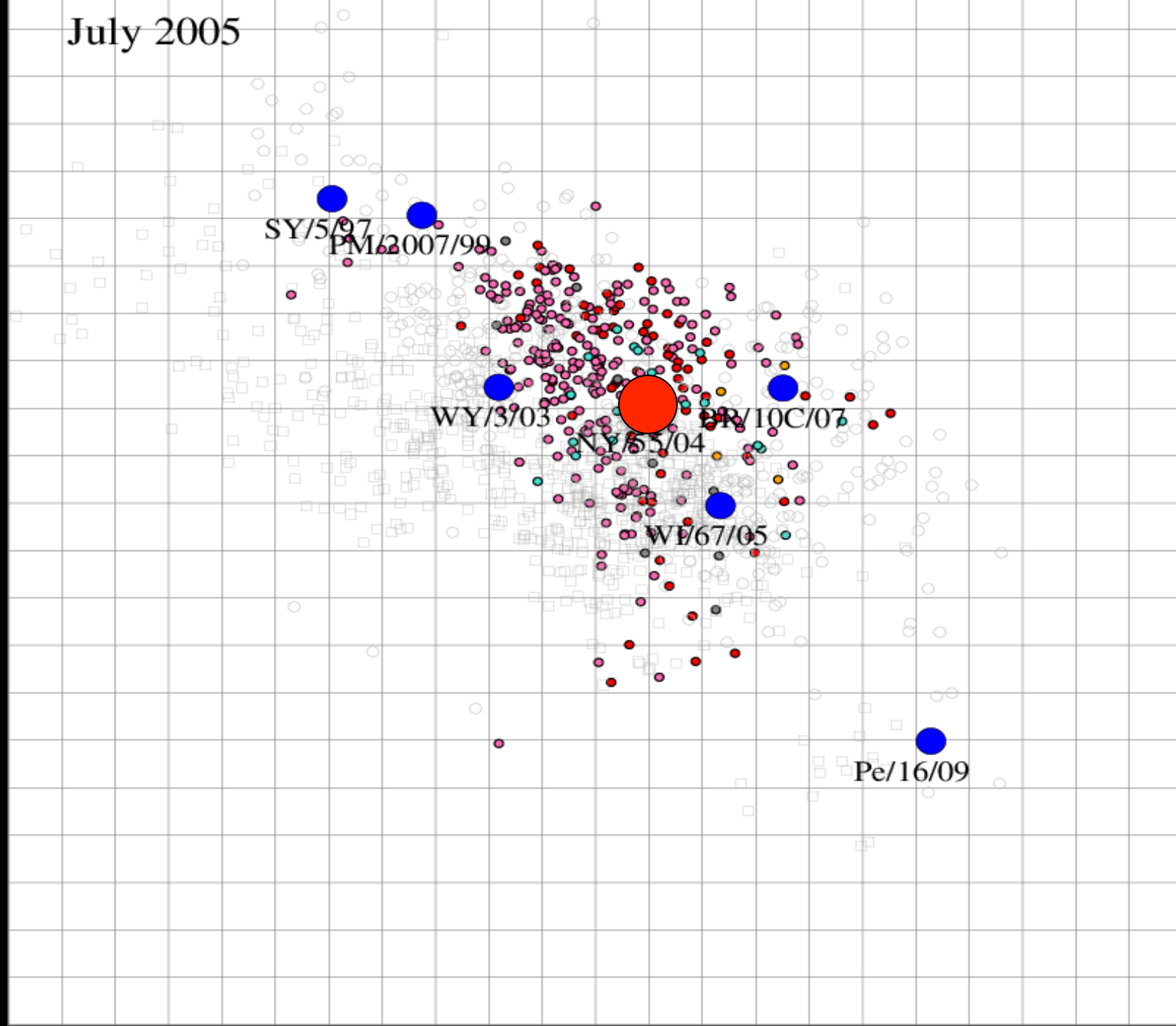
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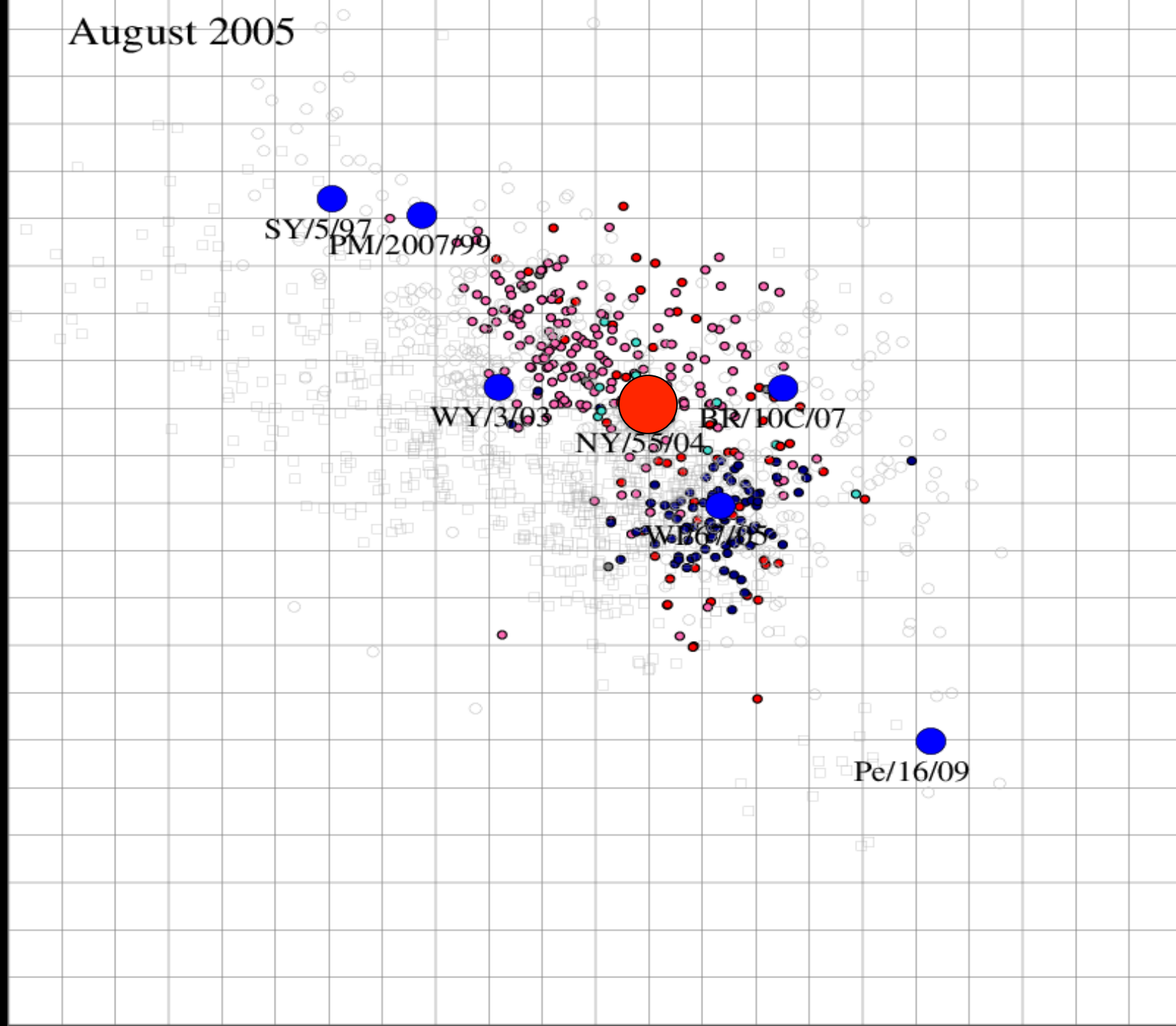
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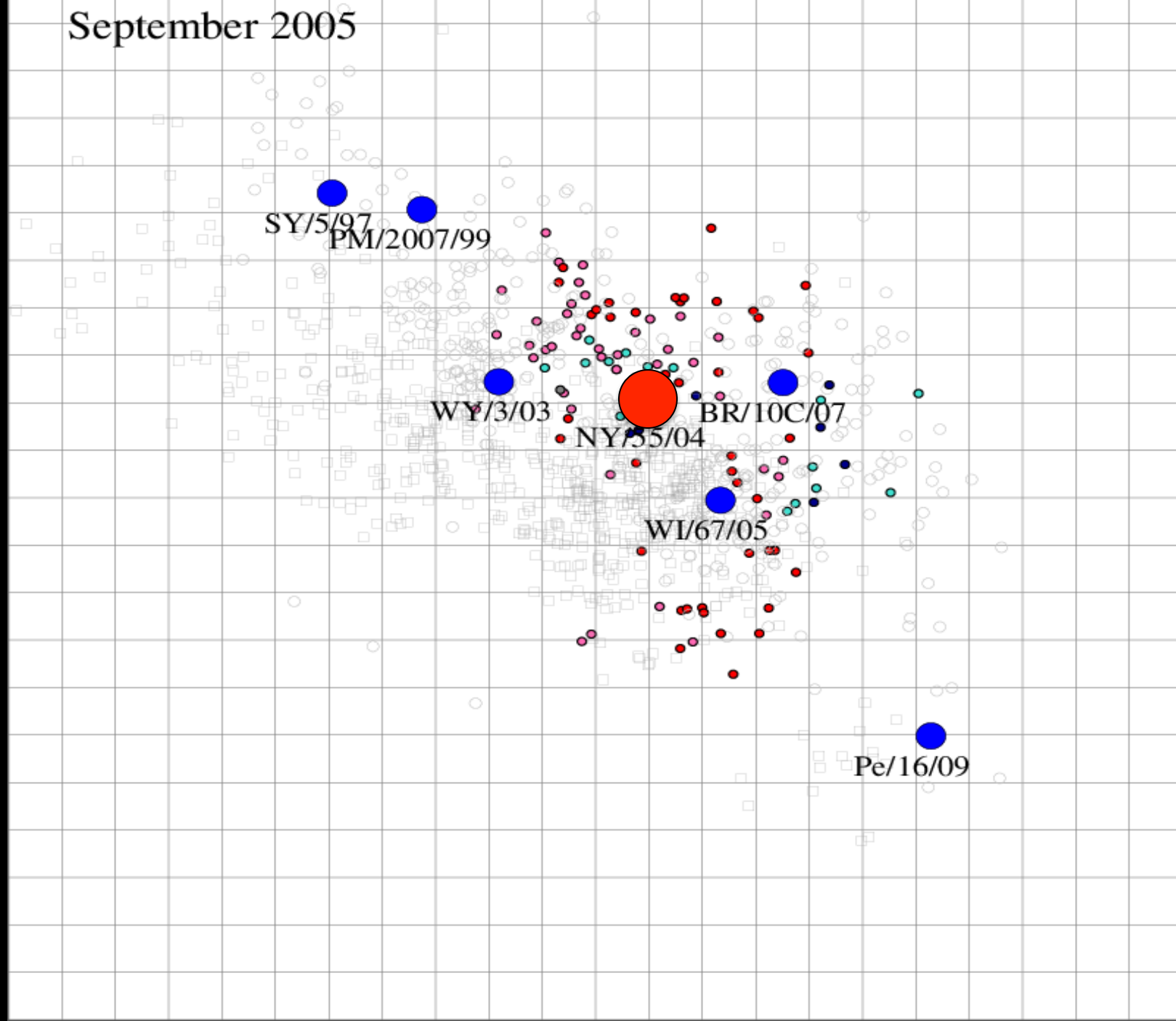
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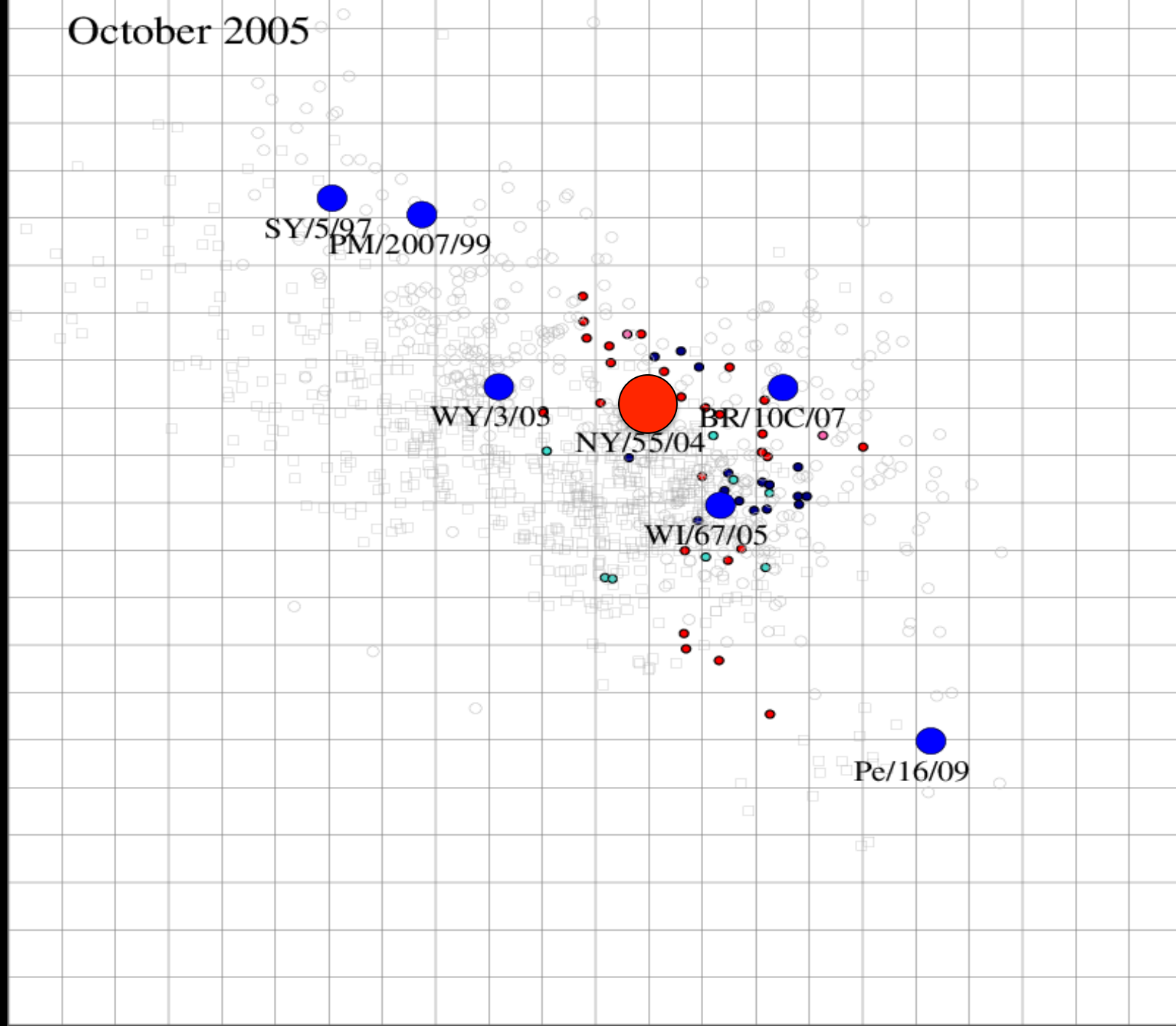
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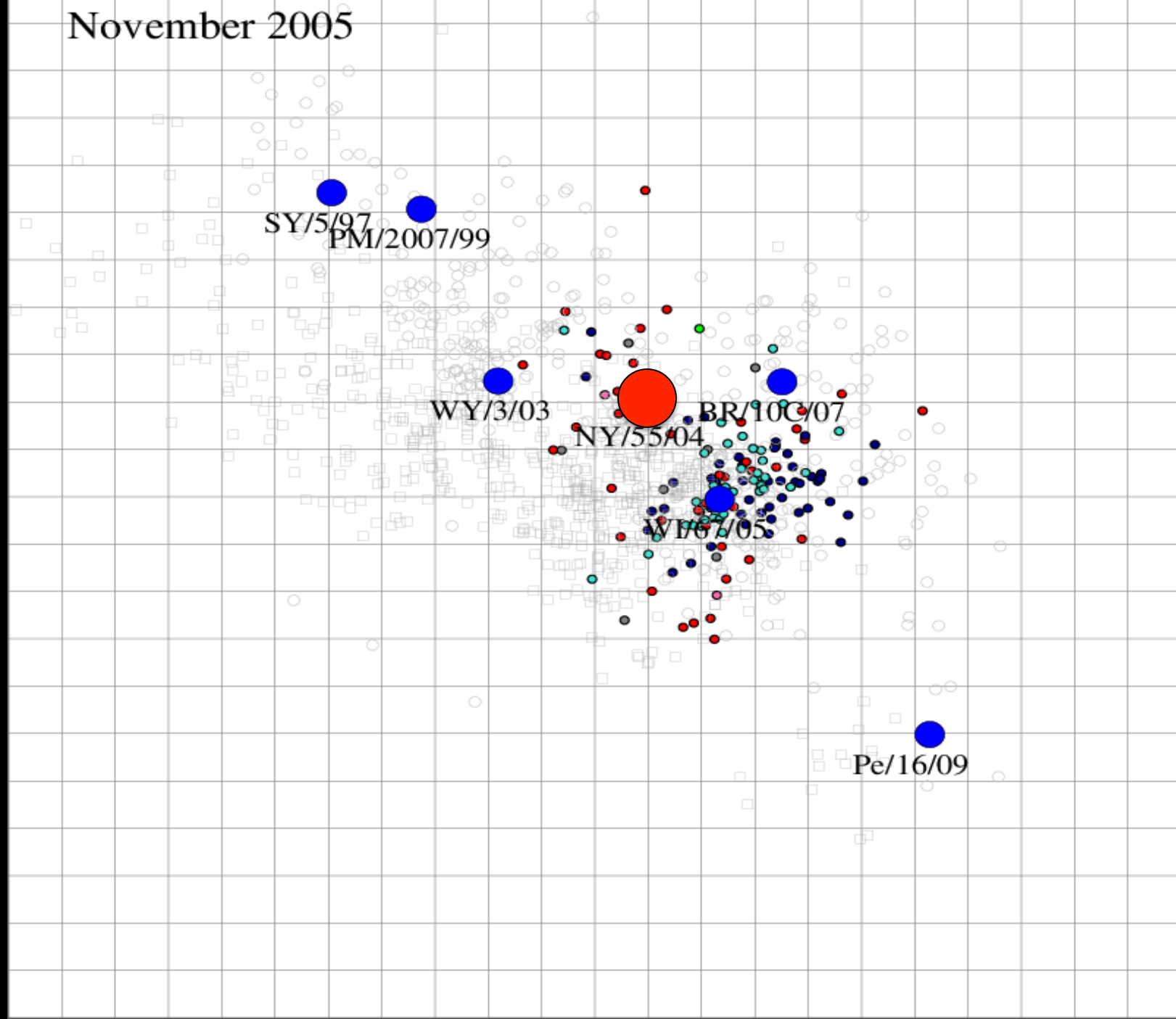
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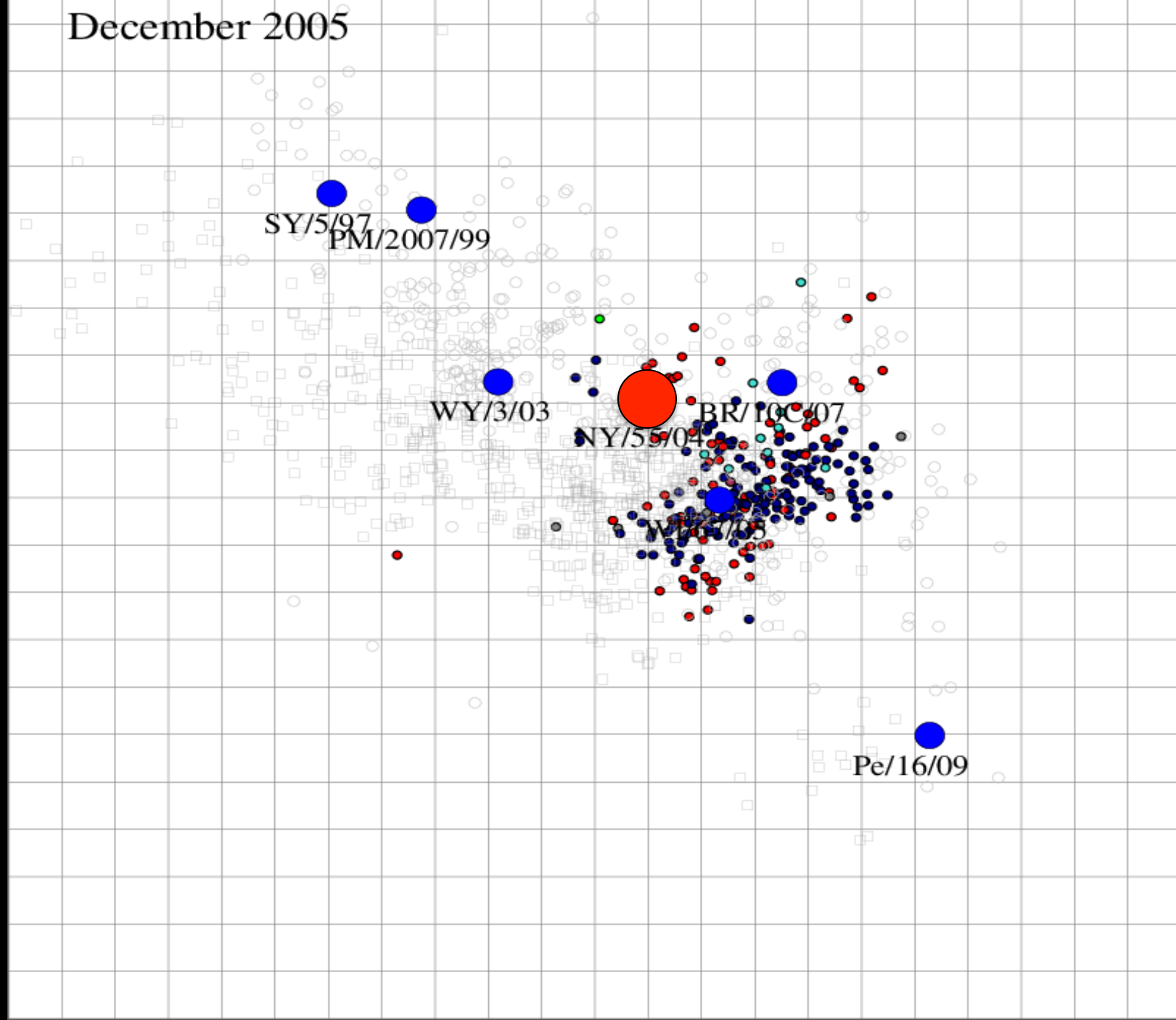
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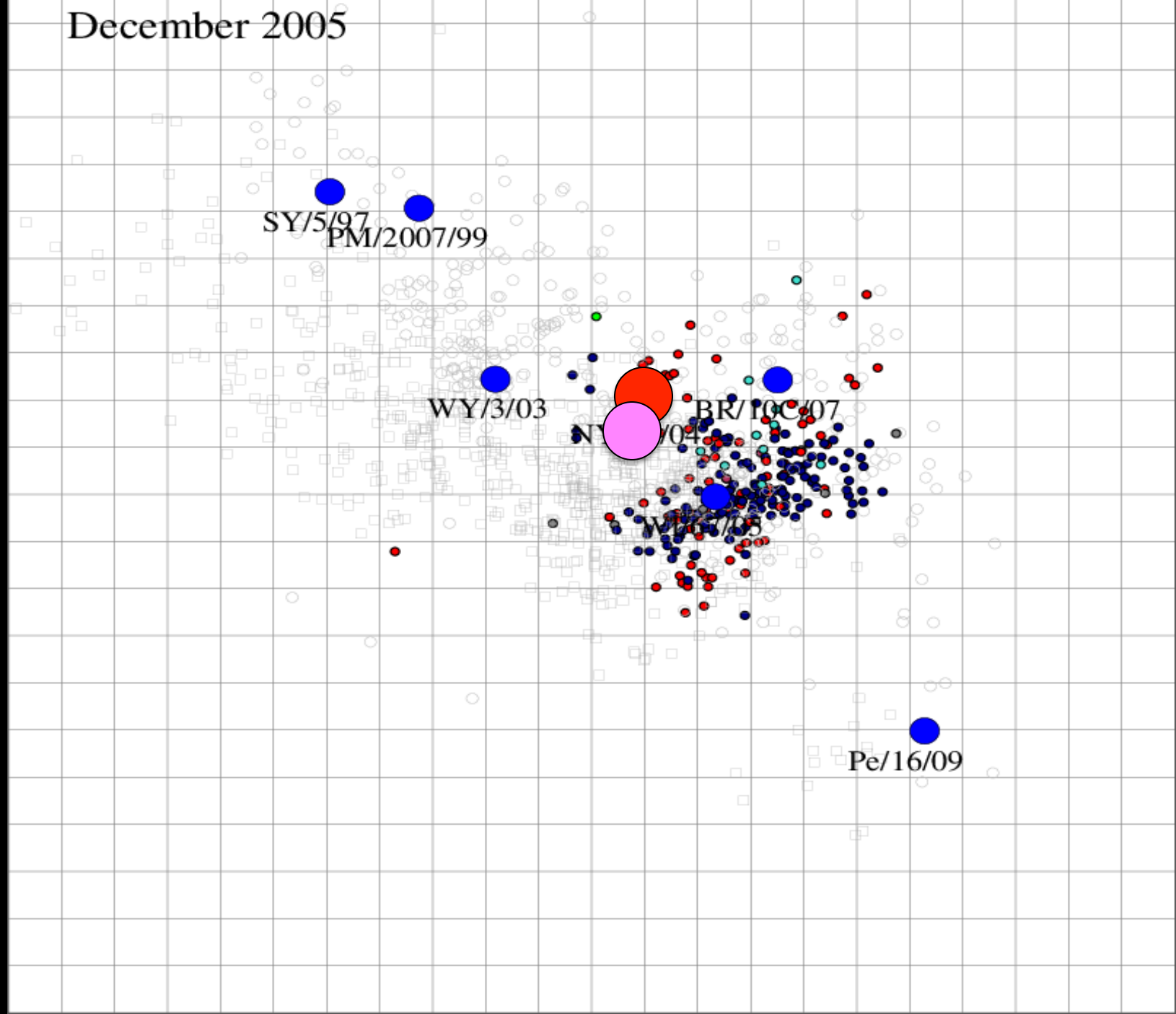
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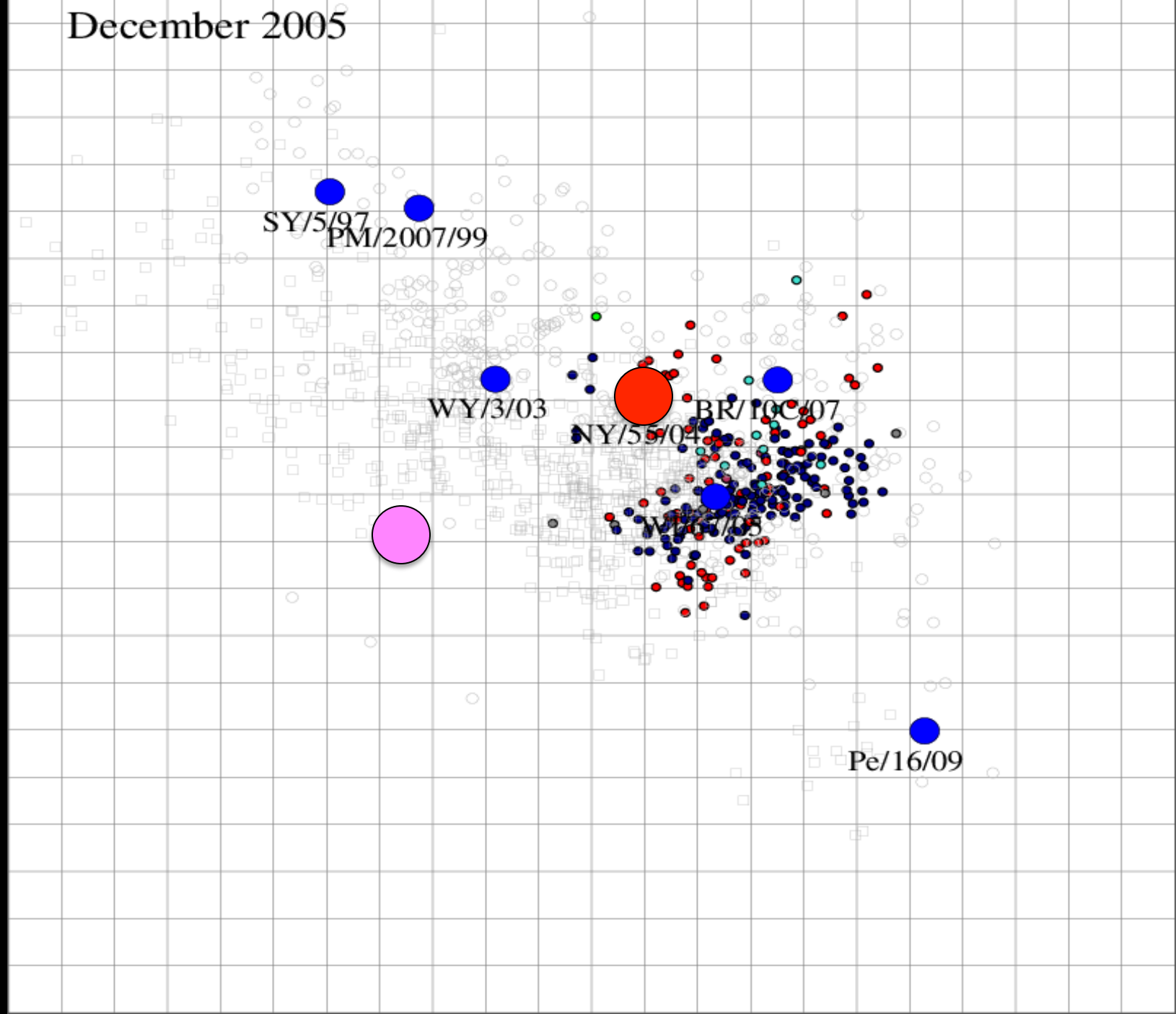
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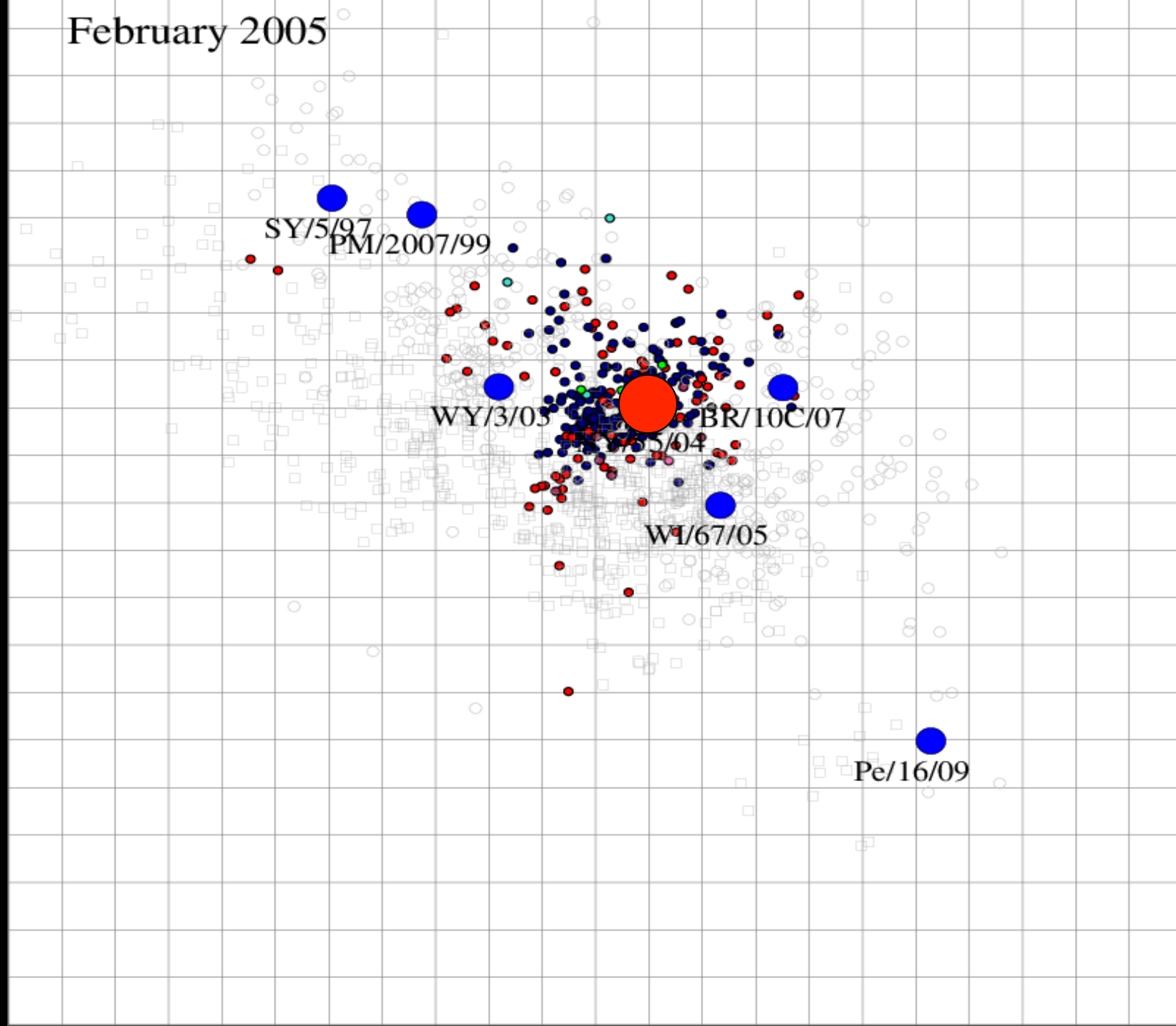
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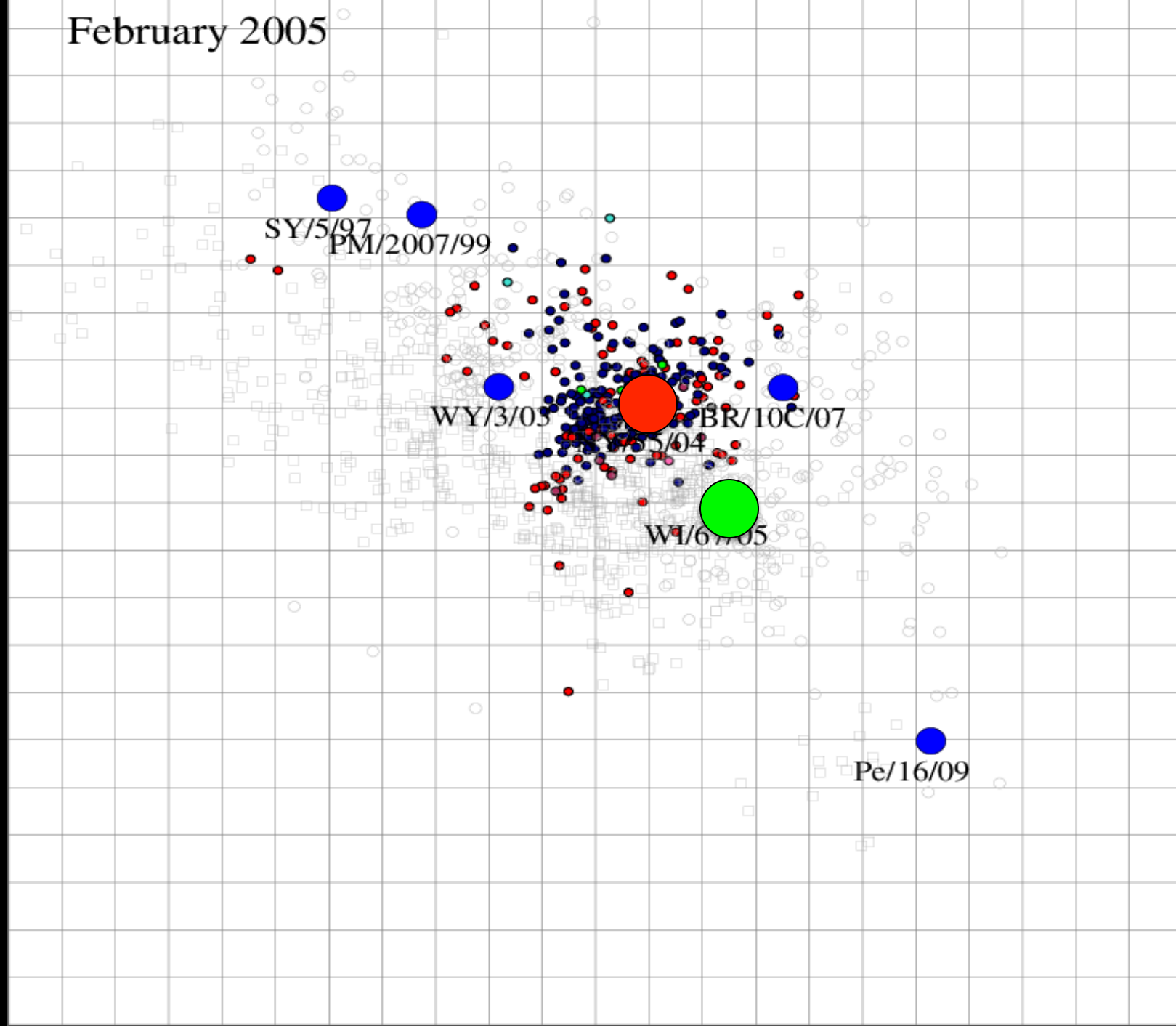
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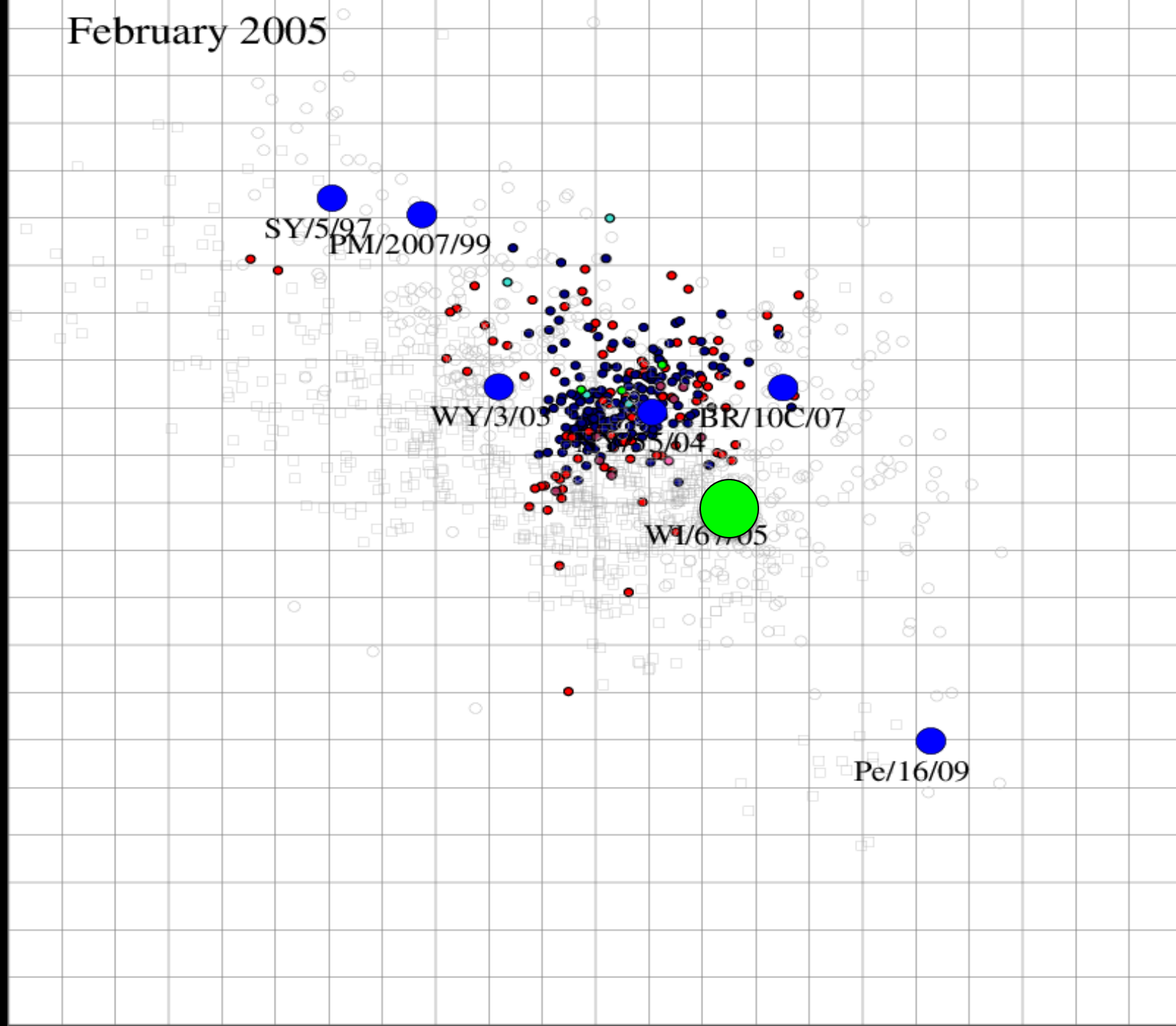
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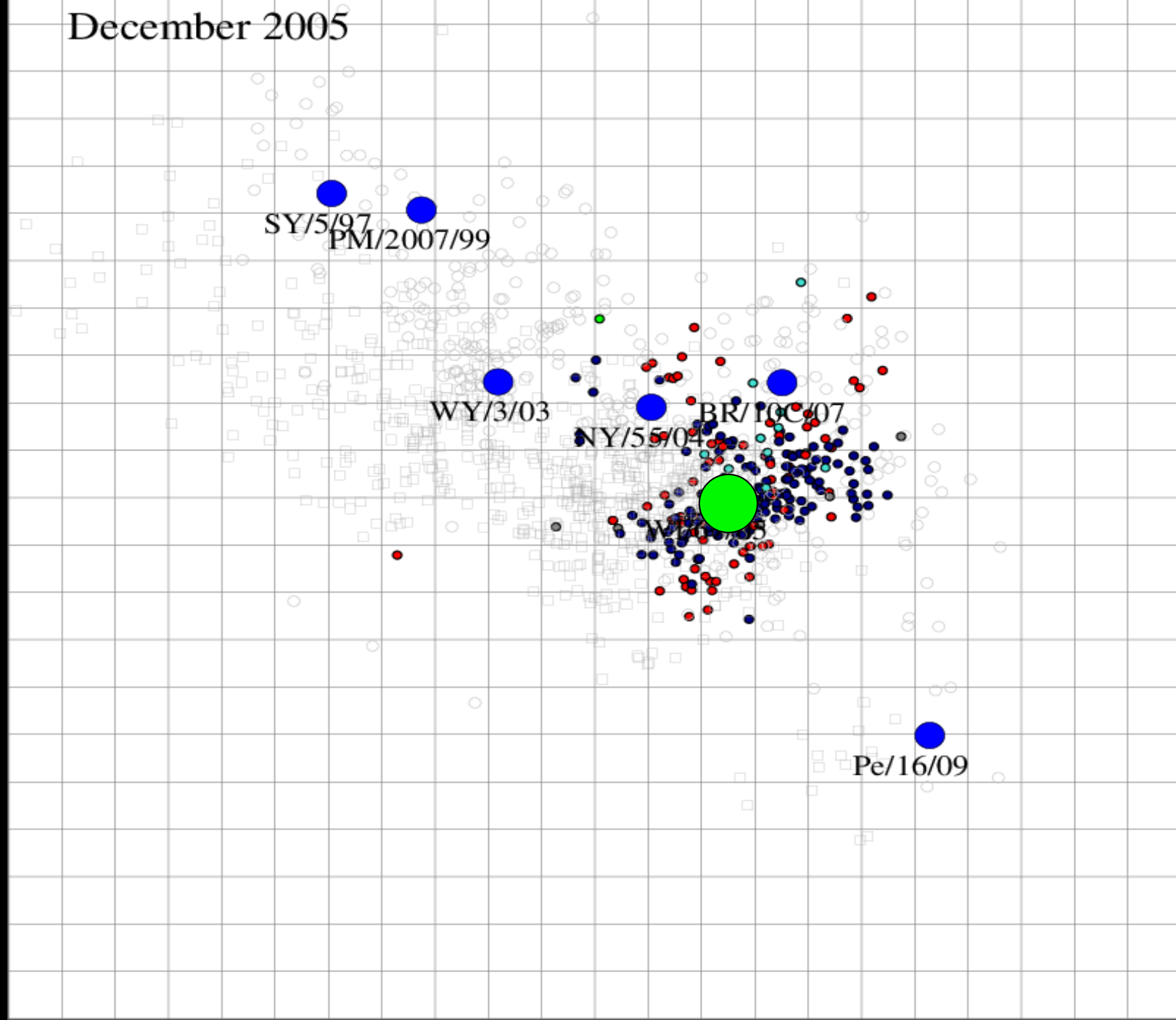
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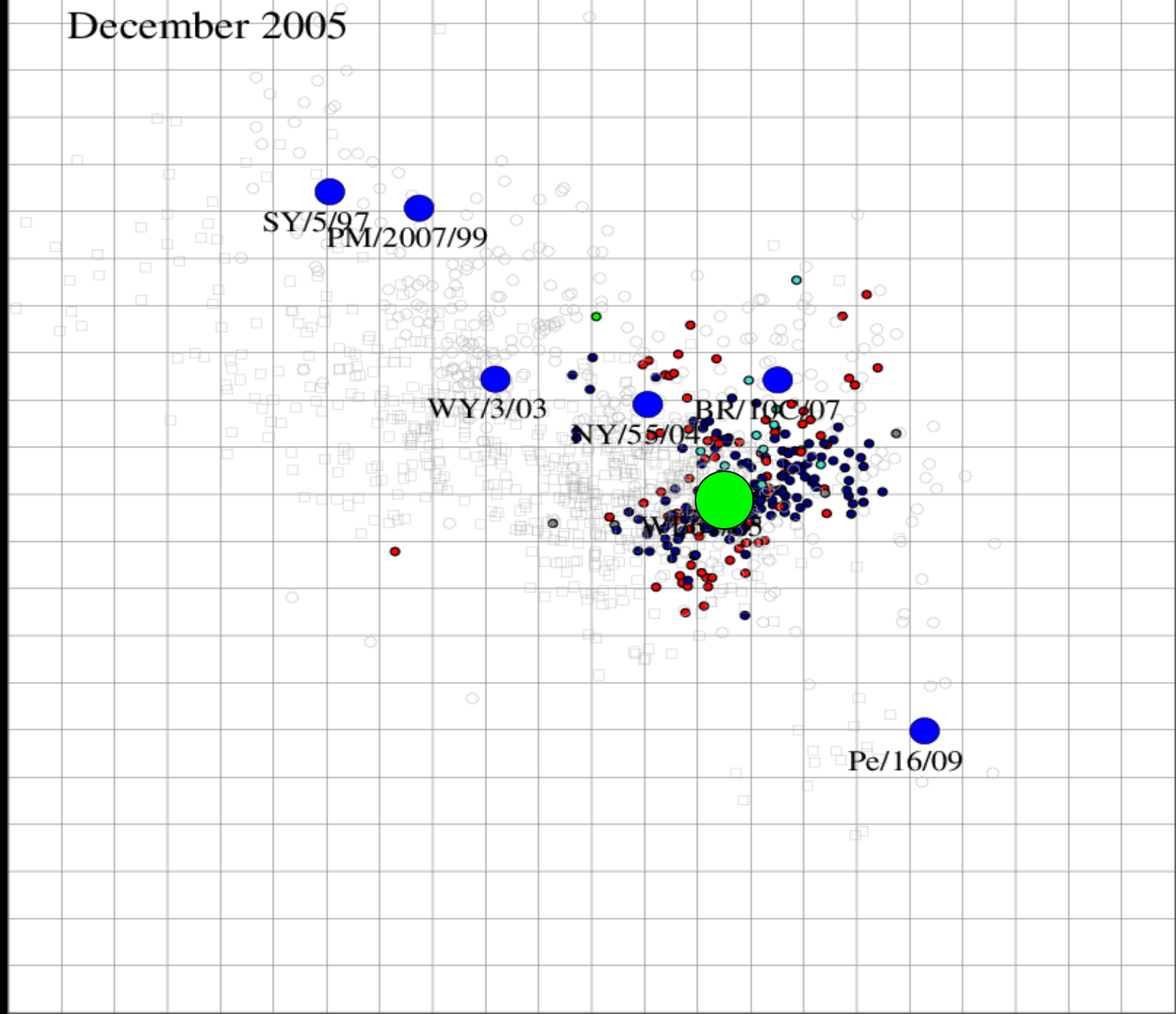
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December 2005



December 2005



B lineage

Pandemic

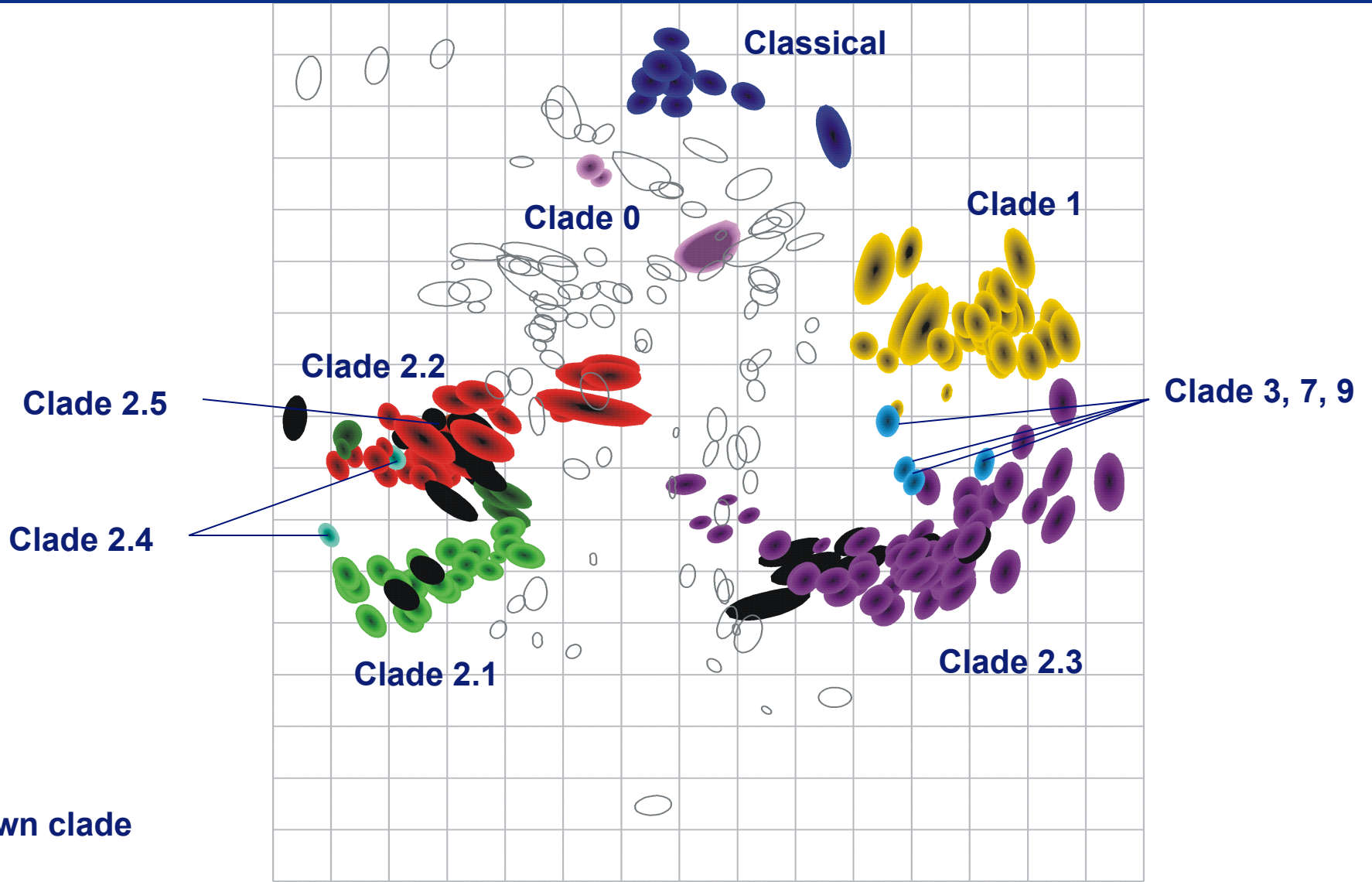
Egg

Prediction

H5 influenza antigenic map

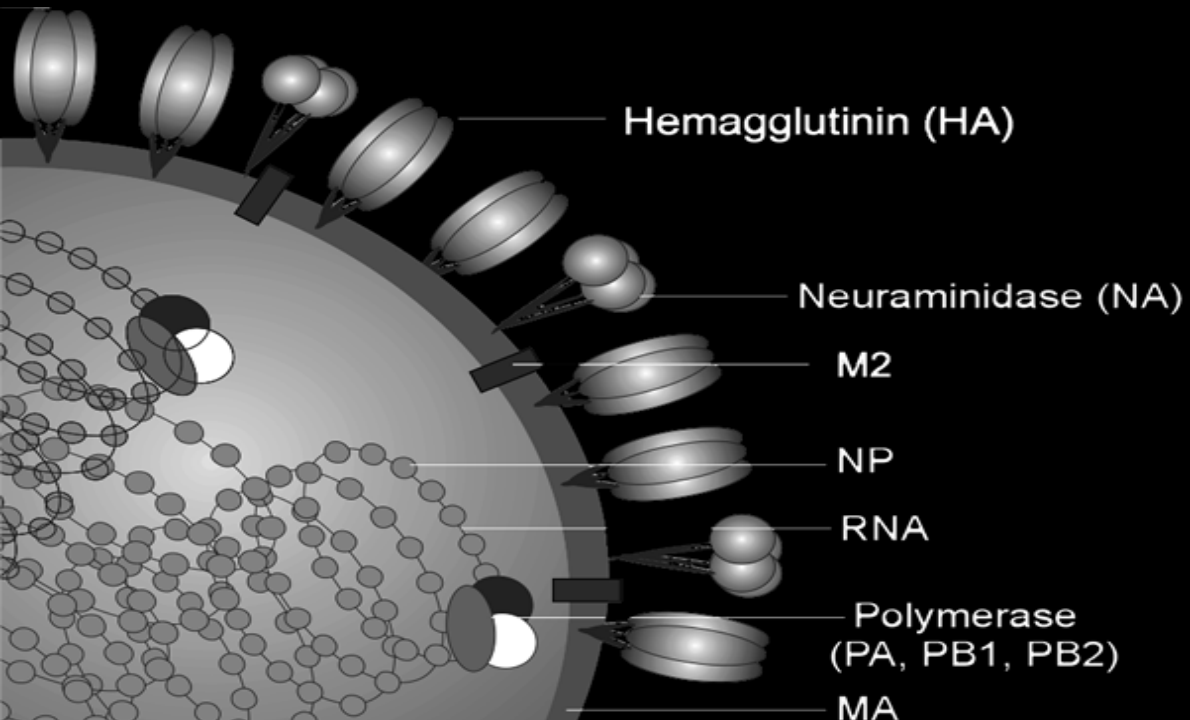
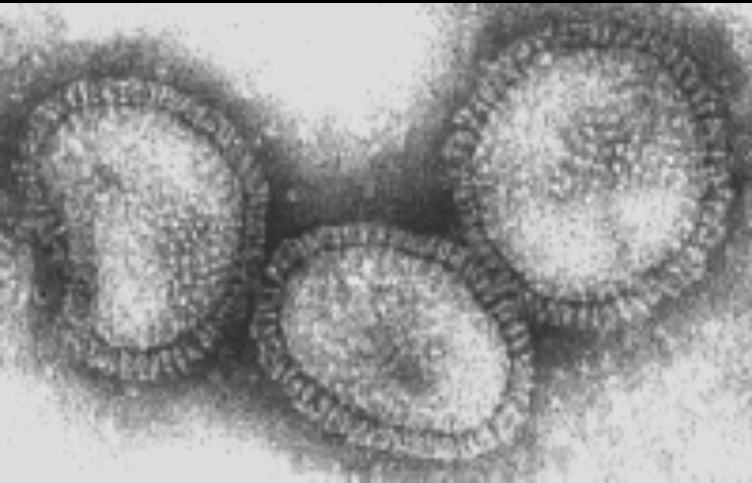
Data from:

- CDC
- St Jude
- Hong Kong U
- Erasmus MC



Black: unknown clade

Influenza virus



Avian H7

