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NERC Frequency Response Standard BAL-003-1

NERC Frequency Response Standard, Current Status, Issues and 2010 to 2013 Field Trial Results

For: Operating Reliability Subcommittee (ORS)

By: Carlos Martinez – CERTS/ASR

Minneapolis, MN September 10, 2013

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Frequency Response Standard (BAL-003) Background, Current Status, Issues and Timeline

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NERC Frequency Response Standard BAL-003 Current Status and Timeline

Current Status

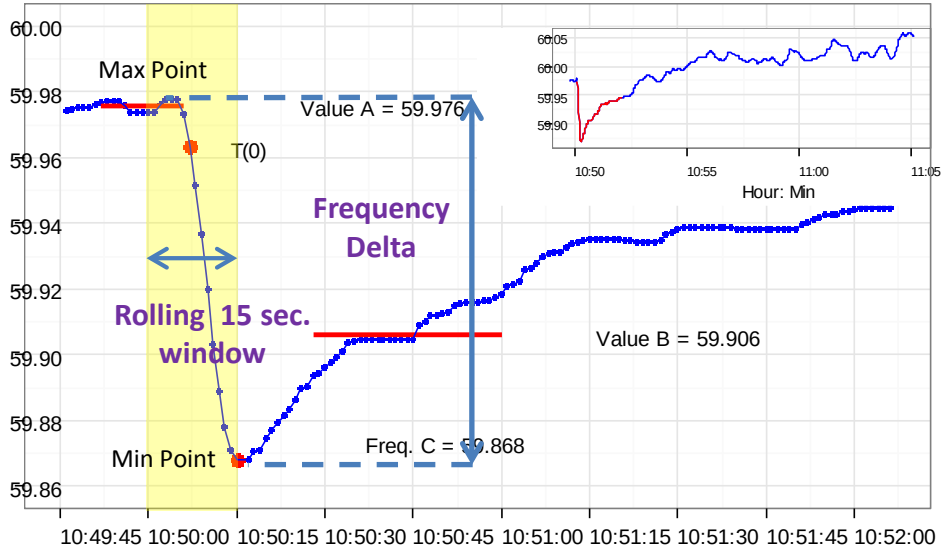
2007 March	2010 October	2013 January	2013 April	2013 July	2013 4th Quarter	2015 January
FERC Order 693 Requesting Changes to BAL-003, Defining Requirements for Frequency Response	FERC Extended Time for BAL-003 Mods to May 2013	Industry Voted and Approved BAL-003 Approved by NERC Board	BAL-003 Filed with FERC	FERC NOPR Proposing Approval for BAL-003 & Concerns with Primary Control Sustainability and Use of Medians for FRM	NERC Response to NOPR and Expected FERC Approval	BAL-003 Requirements Effective

FERC NOPR Concern and Possible Directive on Early Withdrawn (Sustainability) of Primary Frequency Response

2010-2013 Field Trial Results and Trends on Sustainability

Candidate Generation and Load Events - Identification Criteria, Yearly Number of Events from 2010 to 2013

Criteria 1 (2010) – Events in black color in monthly report:



Freq(B-A)= -69, Freq(C-A)= -108, Actual Loss [MW]

Criteria 2 (2011) – Events in pink color in monthly report:
Events reported by NERC-SA Group

Criteria 3 (2013) – Events in yellow color in monthly report:
Eastern: If frequency delta is greater than 30 mHz and the lowest frequency is below 59.96 Hz within the same 15- sec. window.
ERCOT: If lowest frequency is below 59.90 Hz or highest frequency is above 60.10 Hz in a 15-sec. window.

INTERCONNECTIONS CANDIDATE GENERATION AND LOAD EVENTS - IDENTIFICATION CRITERIA AND YEARLY EVENTS 2010 TO 2013					
Interconnections	**Events/Frequency Delta**	**2010**	**2011**	**2012**	**2013**
Eastern	Total Events	Generation=90, Load=11	Generation=121, Load=21	Generation=98, Load=15	Generation=81 ,Load=8
	Frequency Delta	+/- 36 mHz	+/- 40mHz	+/- 40 mHz	+/- 40 mHz
Western	Events	Generation=81, Load=3	Generation=63, Load=3	Generation=62, Load=4	Generation=39, Load=2
	Frequency Delta	+/- 60 mHz	+/- 70 mHz	+/- 70 mHz	+/- 70 mHz
ERCOT	Events	Generation=153,Load 75	Generation=174,Load=40	Generation=95, Load=10	Generation=56, Load=2
	Frequency Delta	+/- 70 mHz	+/- 90 mHz	+/- 90 mHz	+/- 90 mHz
Hydro Quebec	Events	Generation=10, Load=0	Generation=29, Load=26	Generation=35, Load-20	Generation=35, Load=31
	Frequency Delta	+/- 250 mHz	+/- 300 mHz	+/- 300 mHz	+/- 300 mHz

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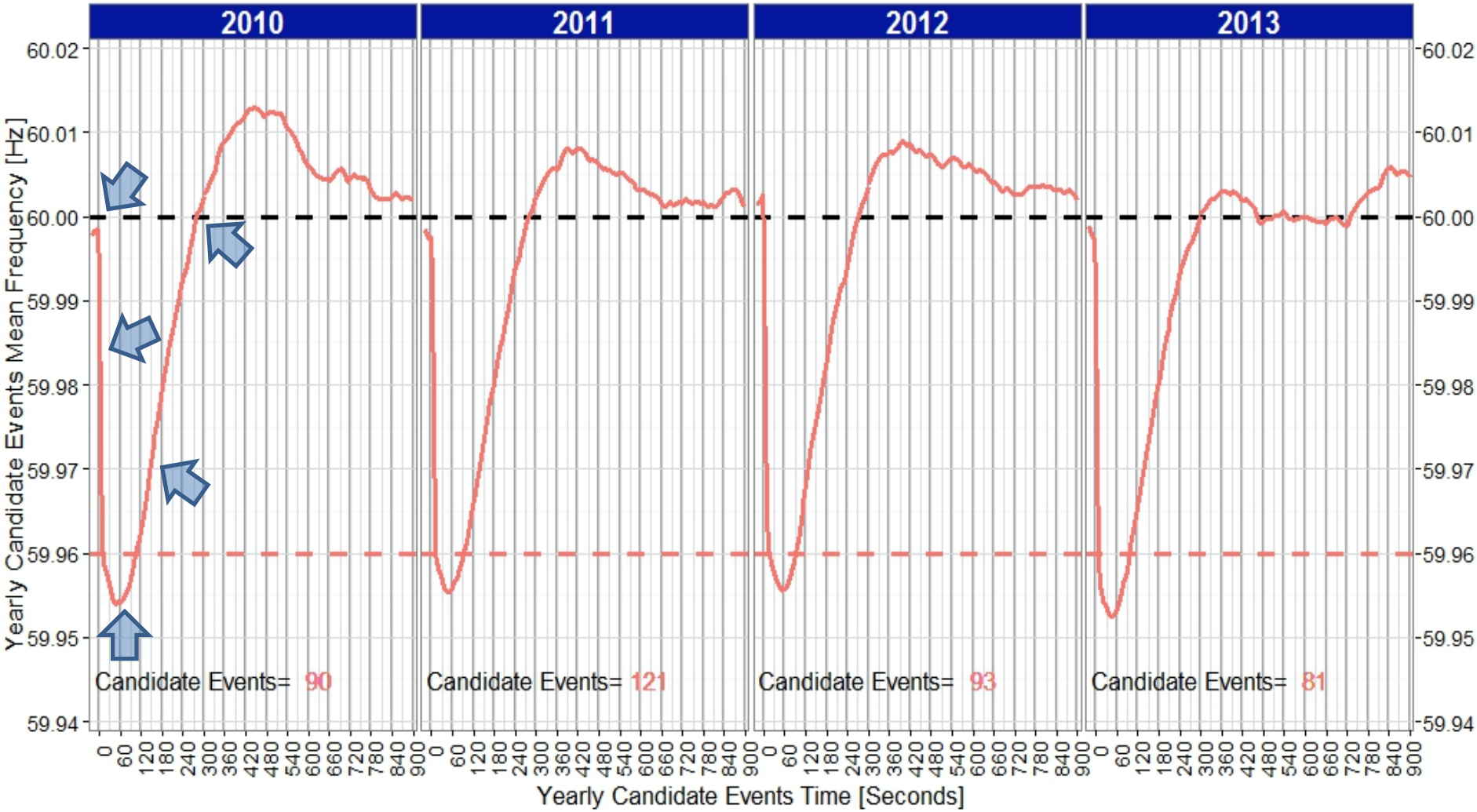
Eastern Mean Frequency Profiles Using Mean of Same Second for Generation Candidate Events from 2010 to 2013



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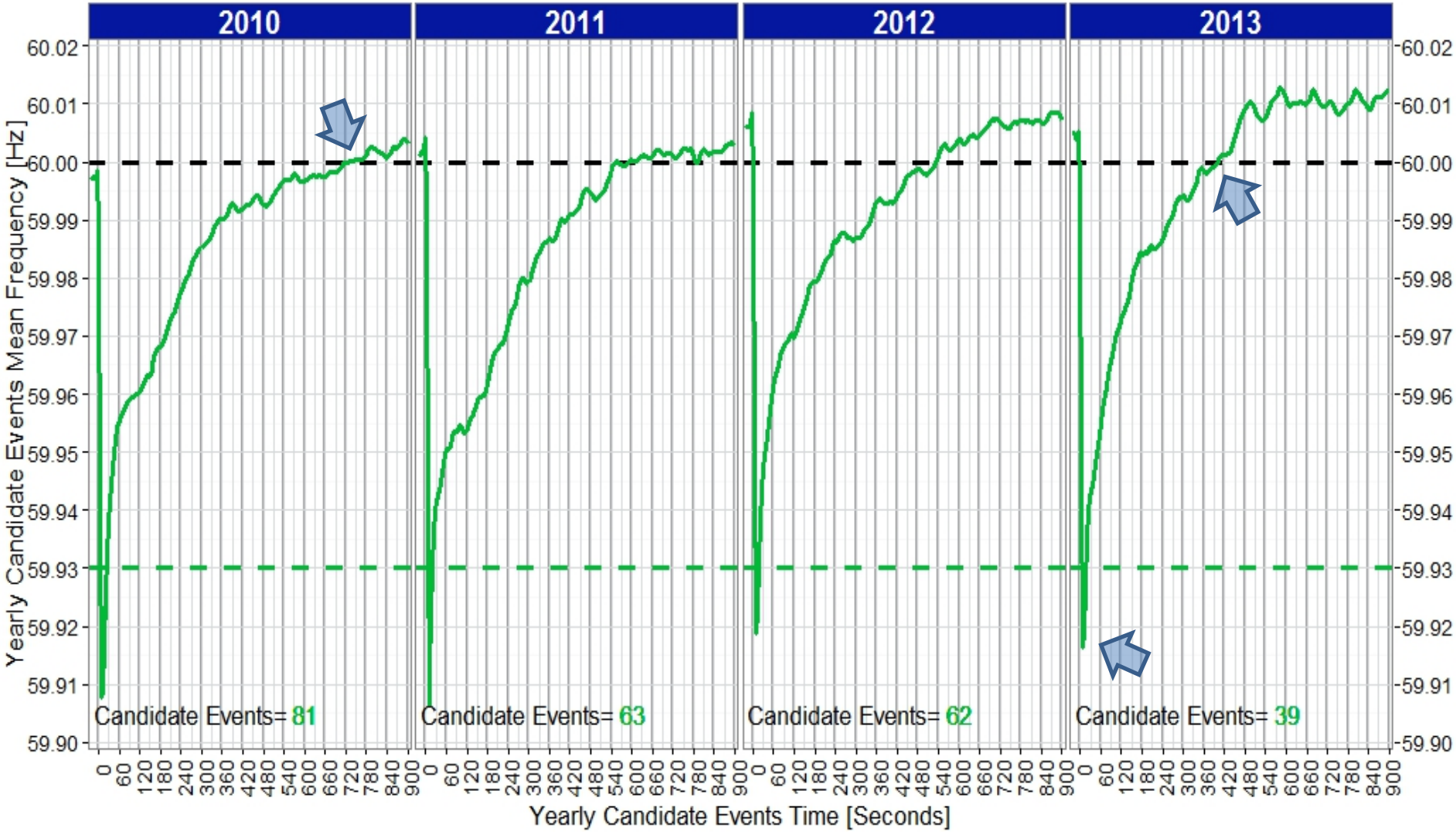
Western Frequency Profiles Using Mean of Same Second for Generation Candidate Events from 2010 to 2013



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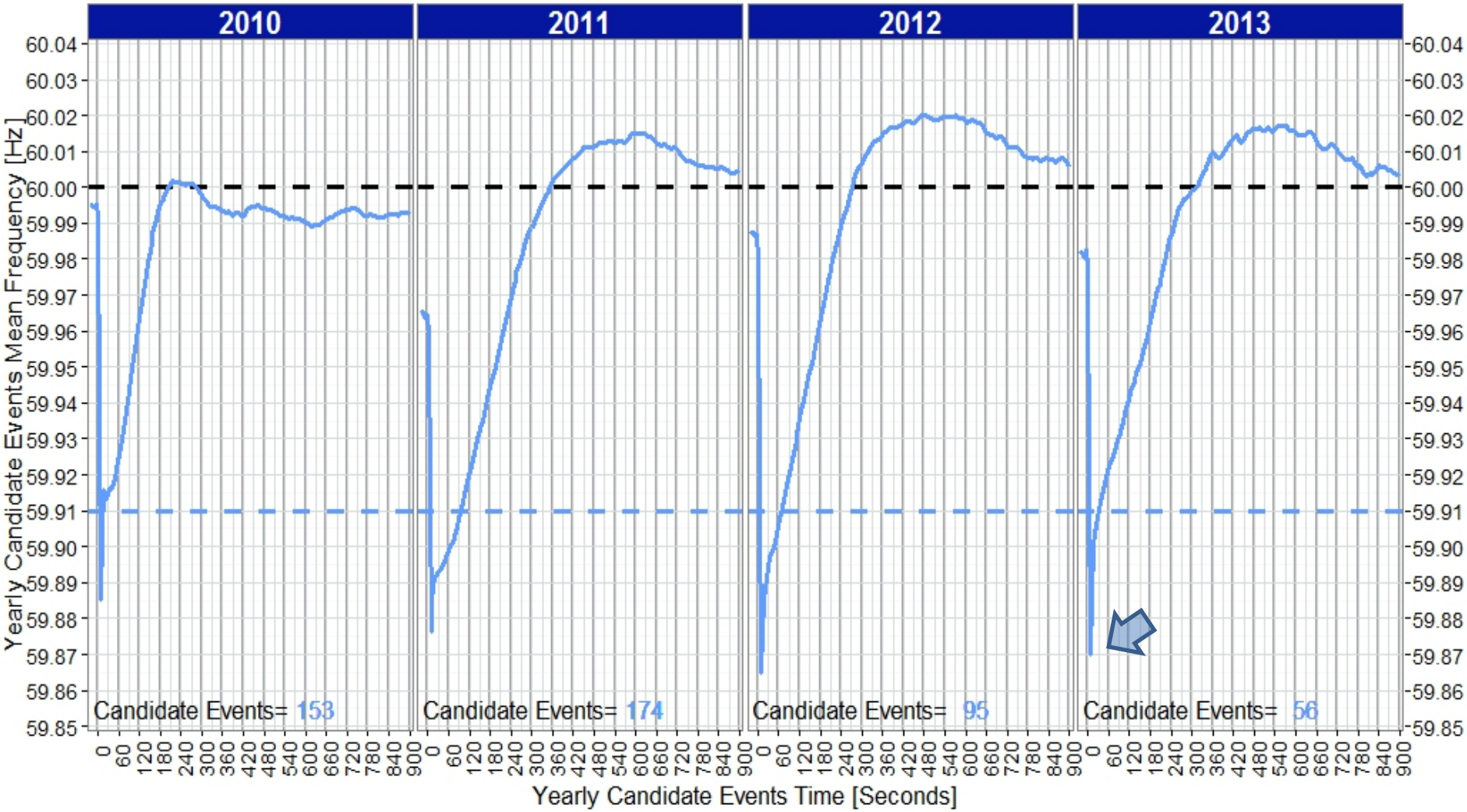
ERCOT Mean Frequency Profiles Using Mean of Same Second for Generation Candidate Events from 2010 to 2013



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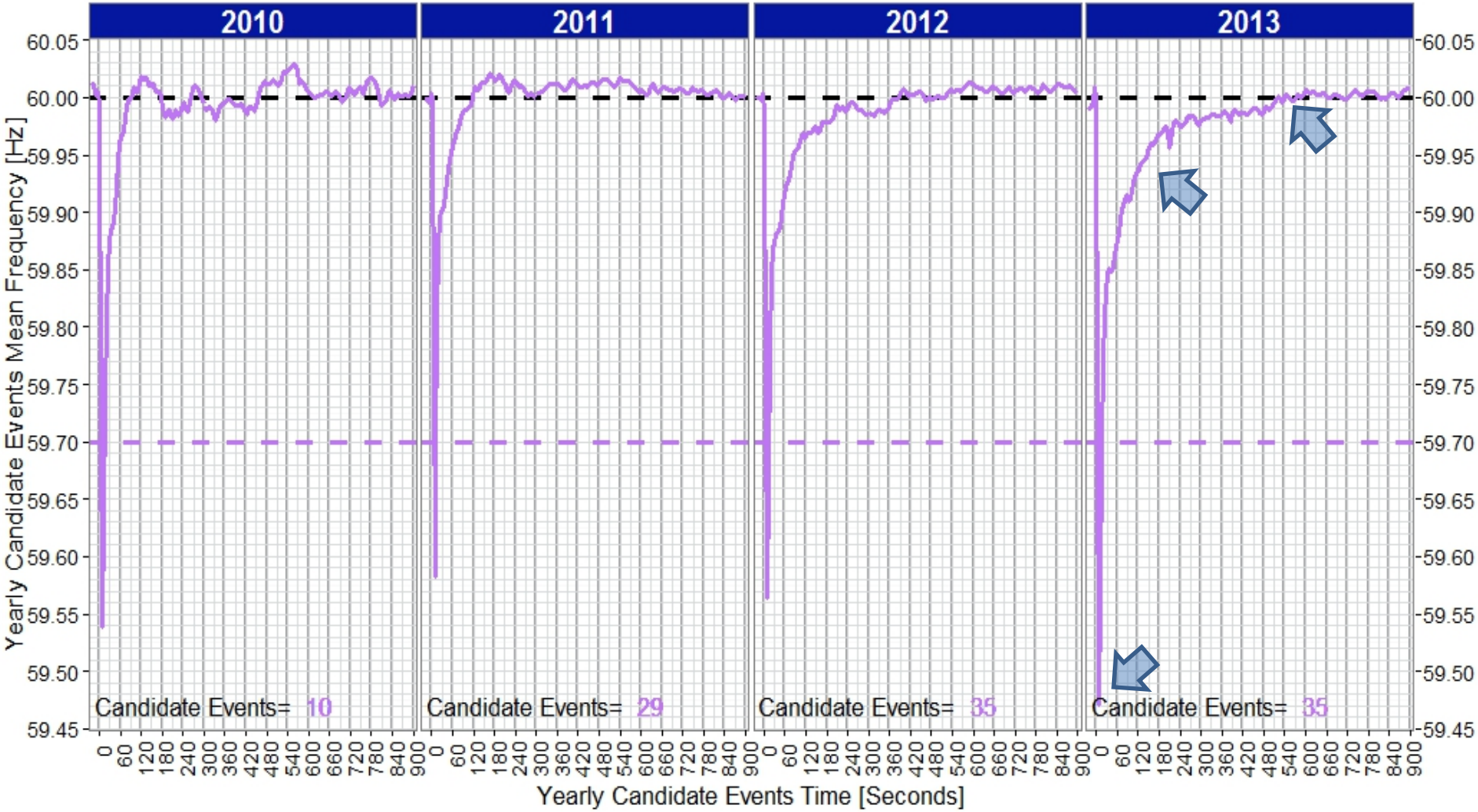
Hydro Quebec Mean Frequency Profiles Using Mean of Same Second for Generation Candidate Events from 2010 to 2013



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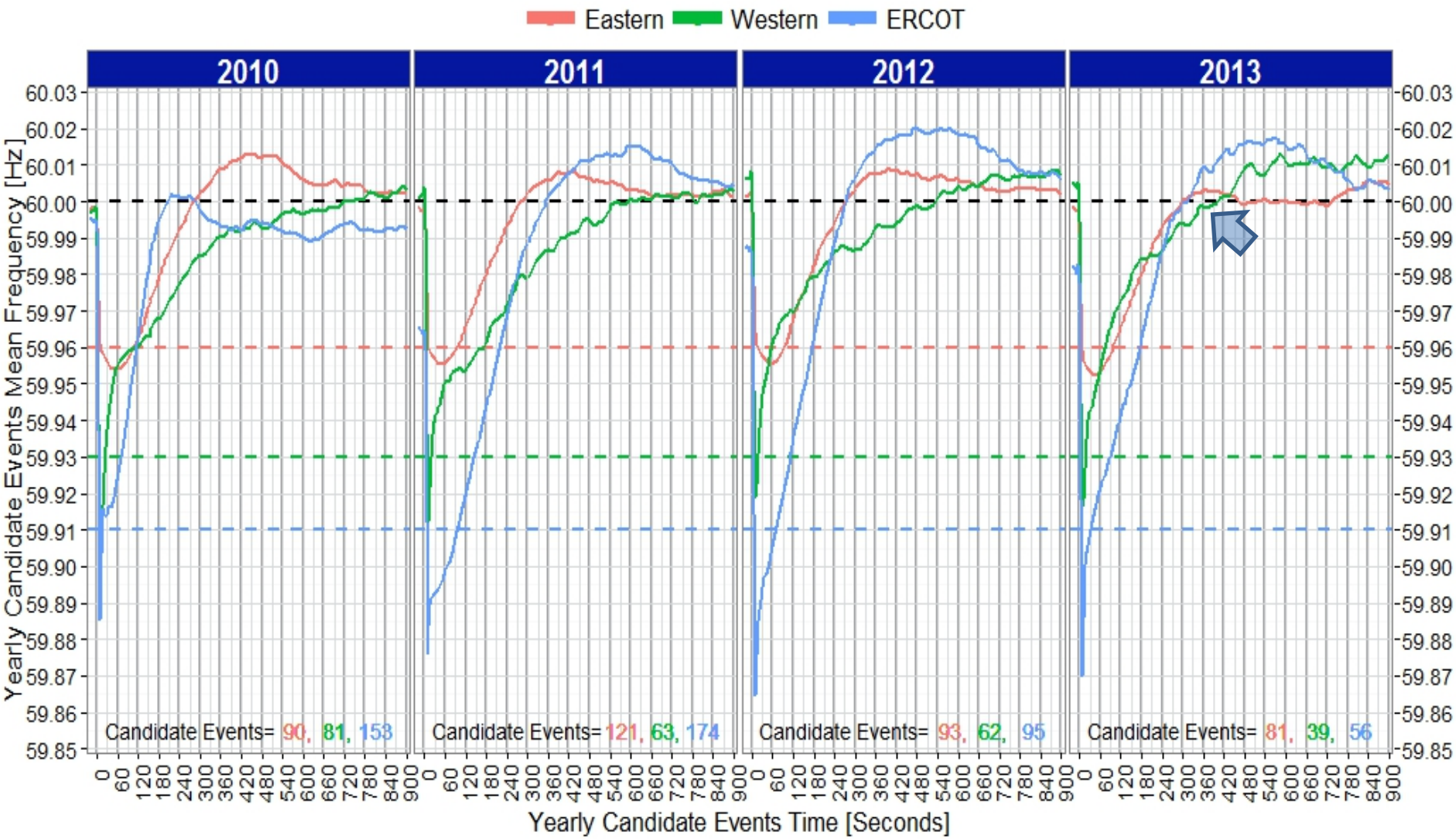
Interconnections Mean Frequency Profiles Using Mean of Same Second for Generation Candidate Events 2010 to 2013



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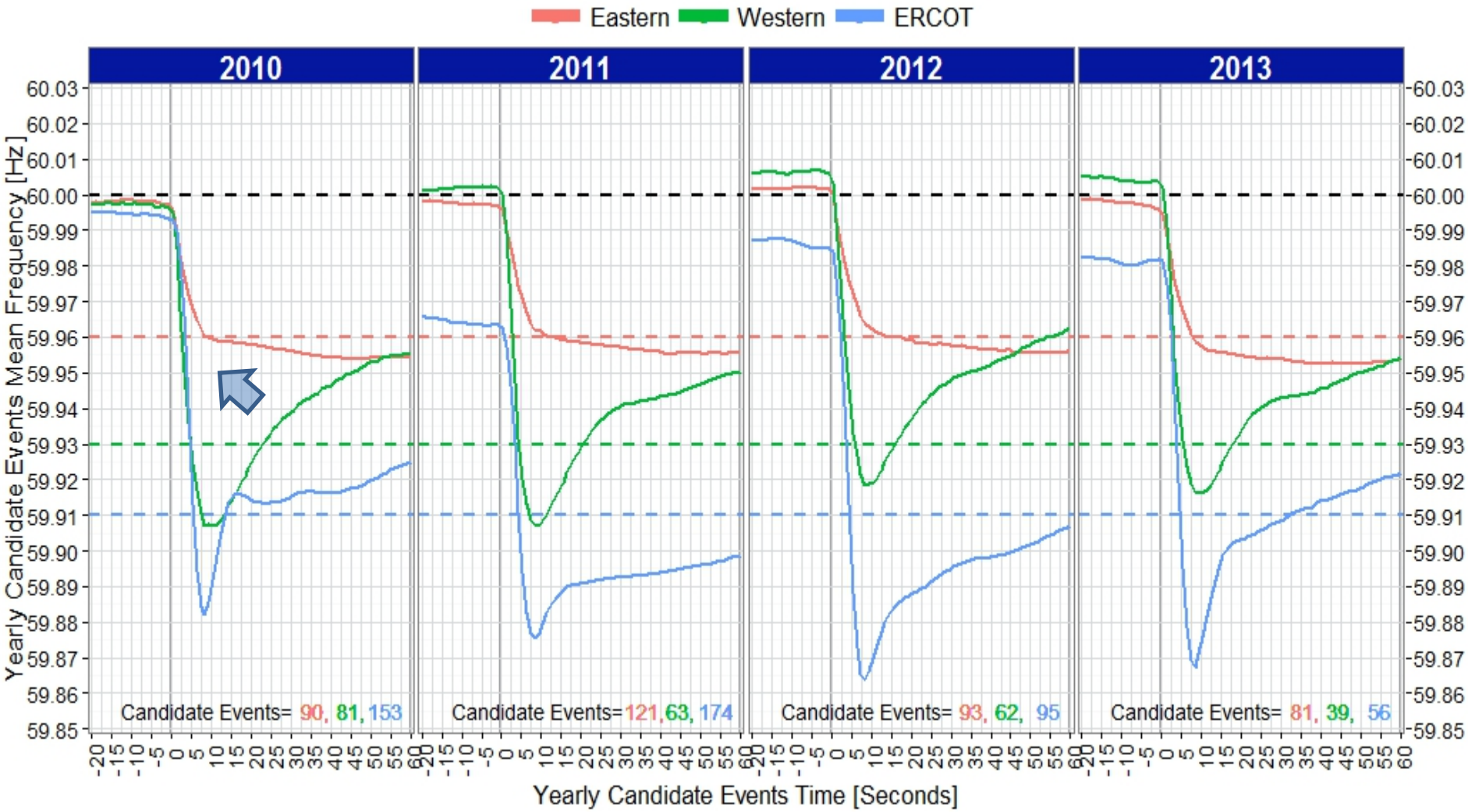
Mean Frequency Profiles Using Mean of Same Second for Generation Candidate Events from 2010 to 2013



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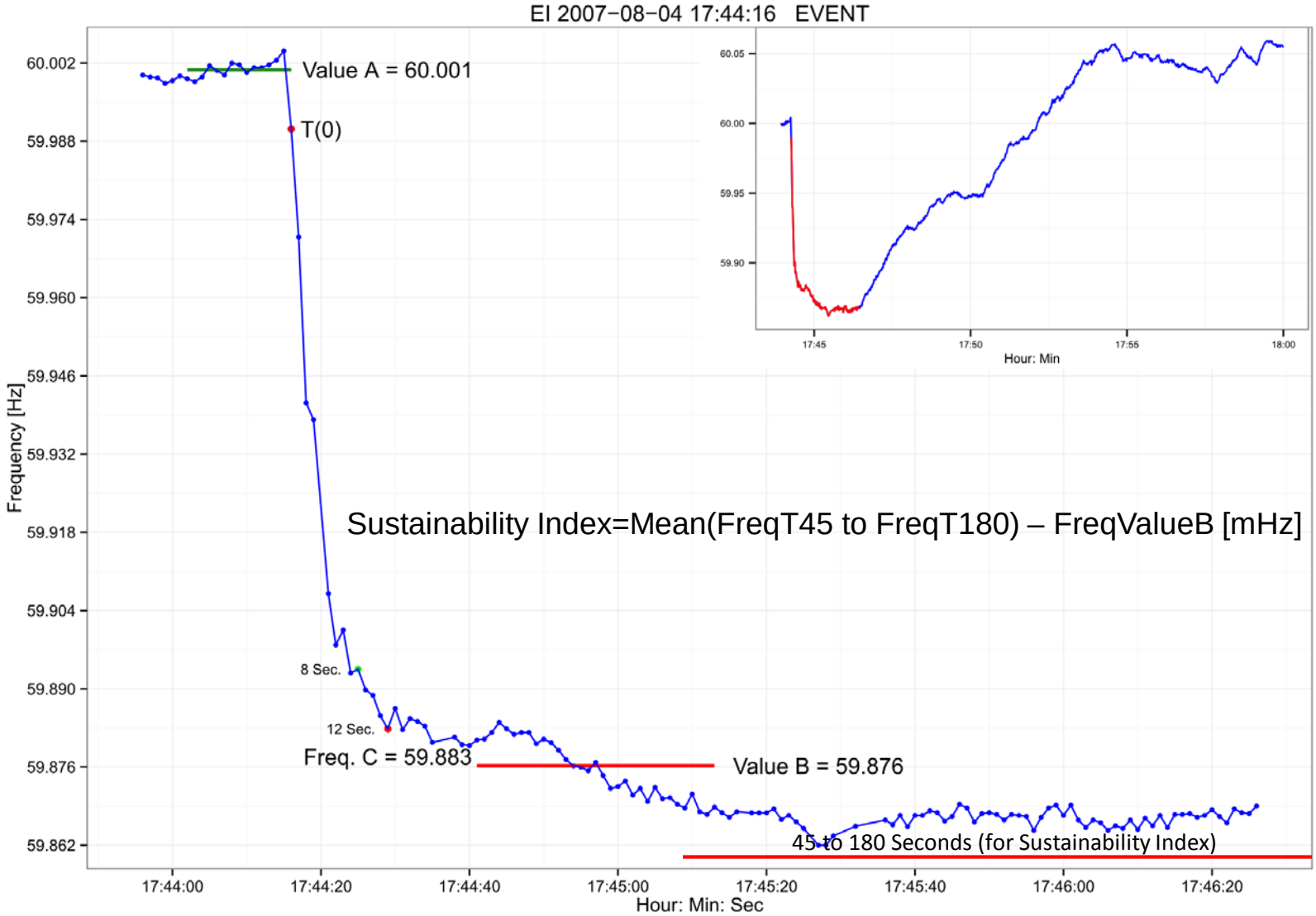
Interconnections Frequency Response Sustainability Indices 2010 to 2013

Frequency Profile for Eastern 2003 Blackout (FERC NOPR)
NERC FRI Propose Sustainability Index Definition



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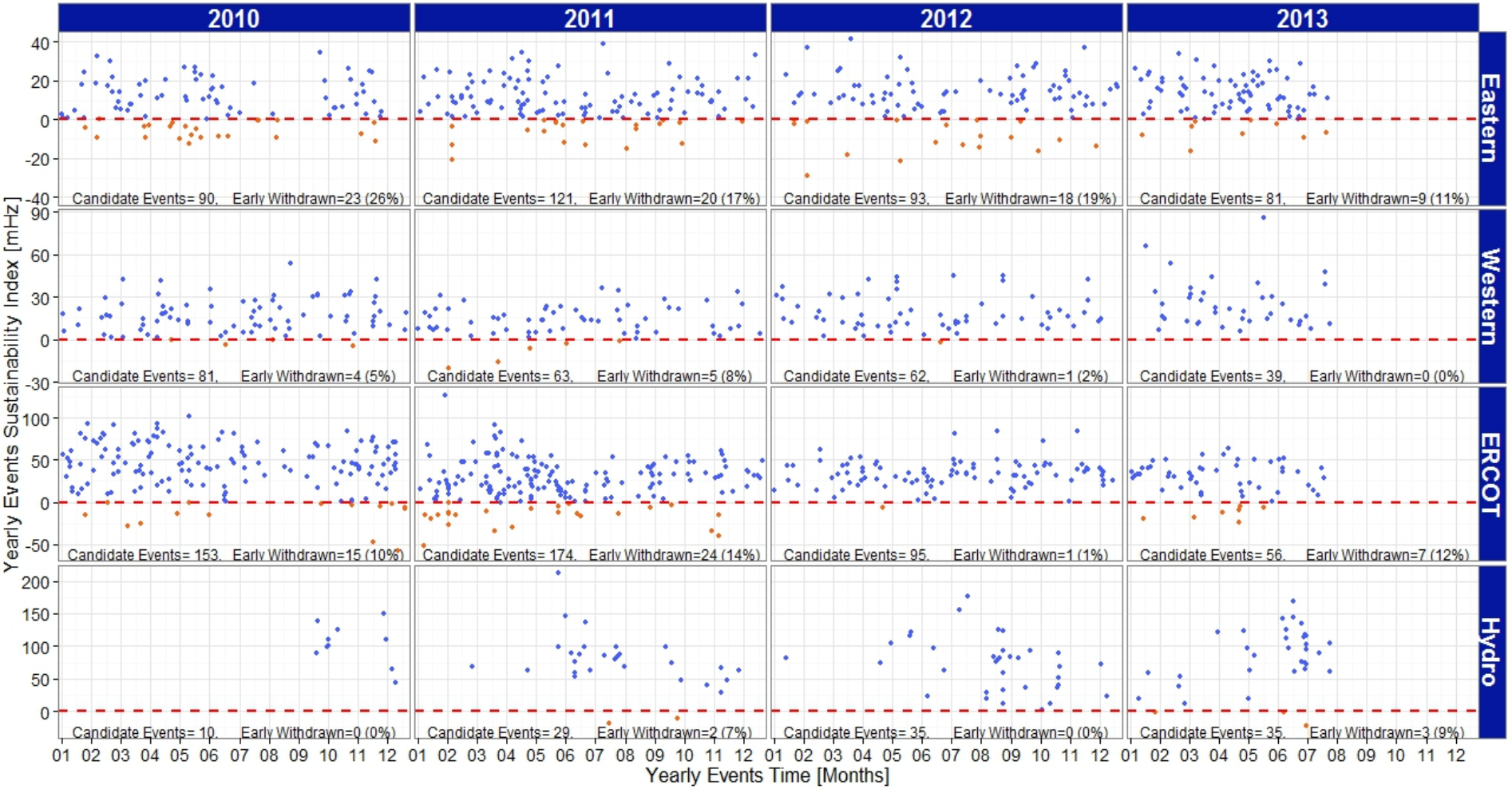
Sustainability Index for Generation Events 2010 to 2013 [Mean(FreqT45 to FreqT180) – FreqValueB] [mHz]



NOTE: A Negative index (red points) is an Indication of Early Withdrawn of Primary Frequency Response

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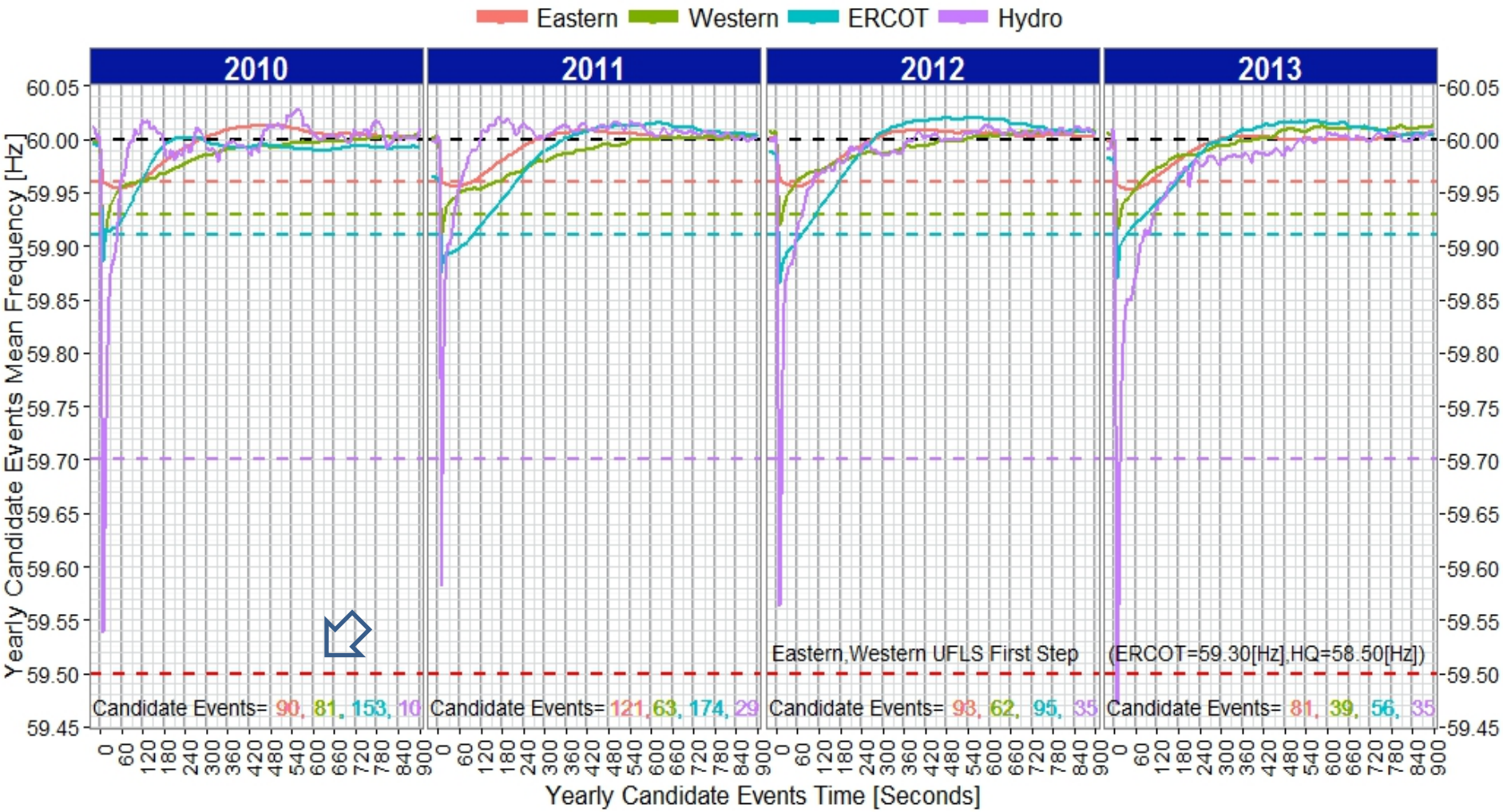

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