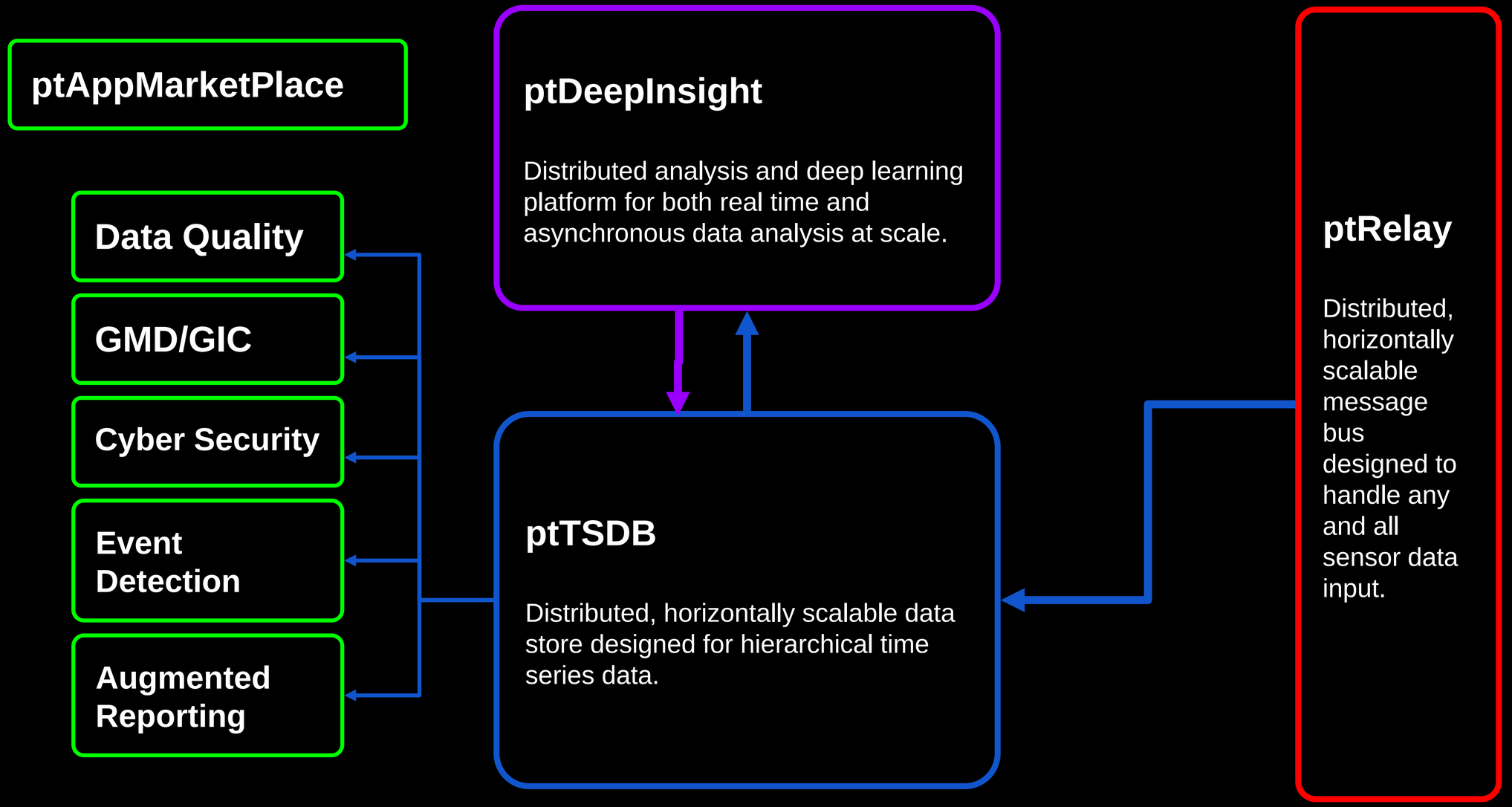
PingThings

Internet Scale, Real Time Stream Analytics

@pingthingsIO

Data Ingest, Storage, and Analysis Platform

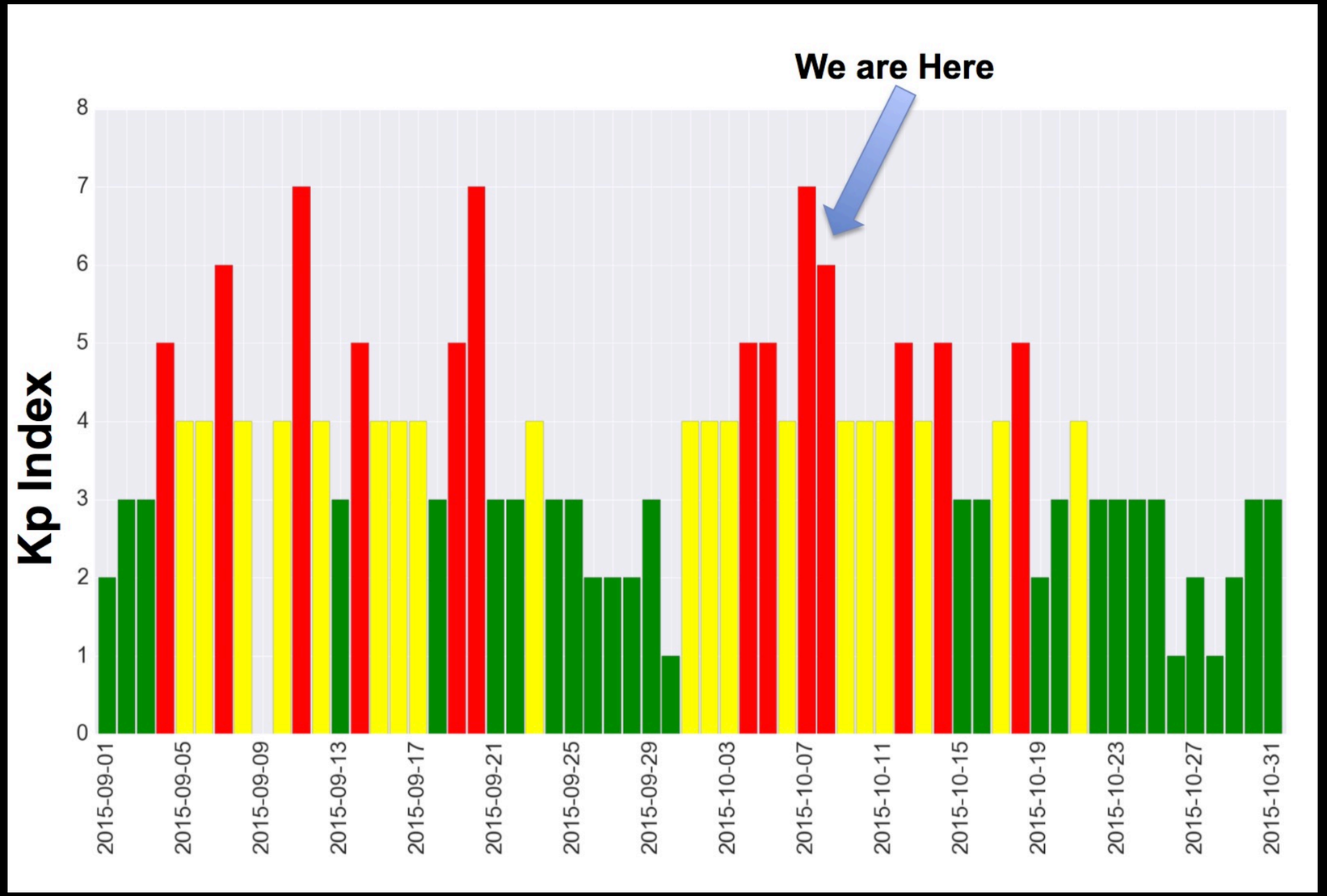


North American Outages

$180 Billion

Source: Lawrence Berkeley Laboratories, Utility Dive

Storm Analysis Event



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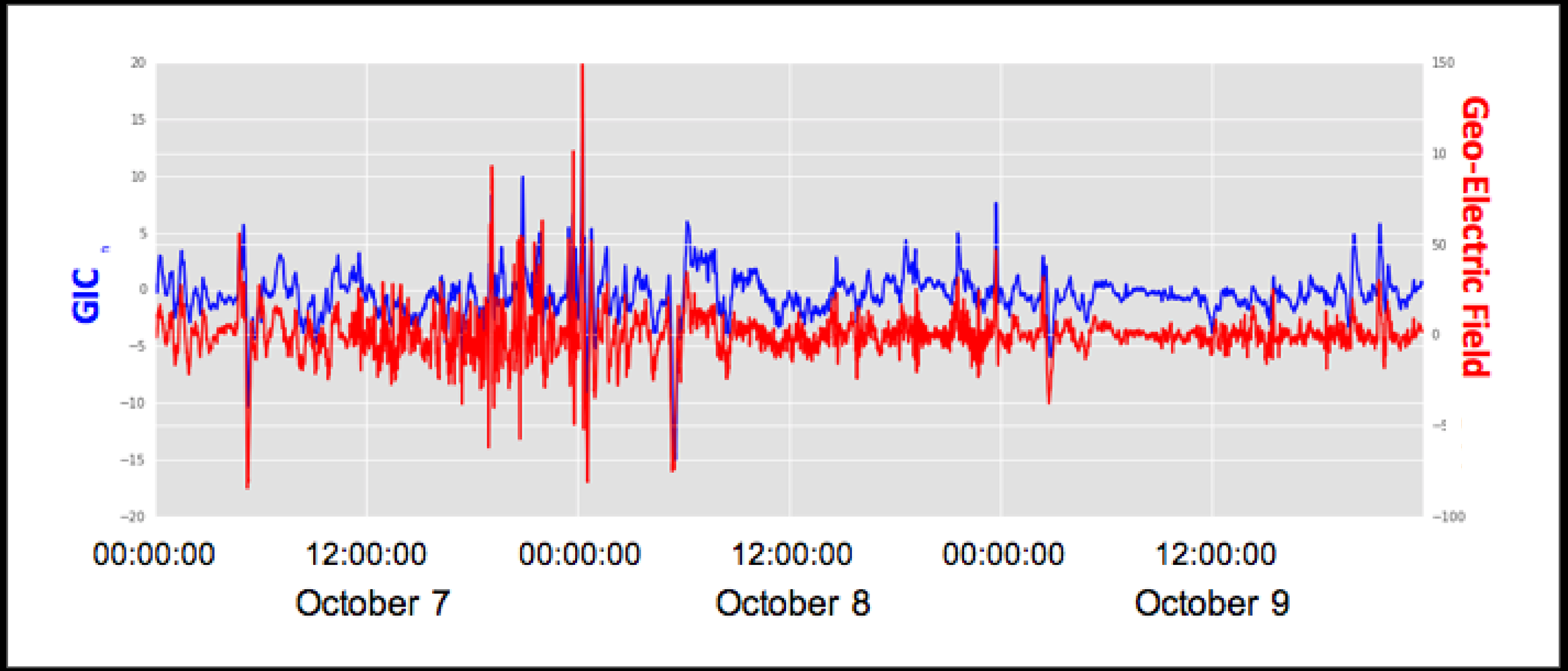
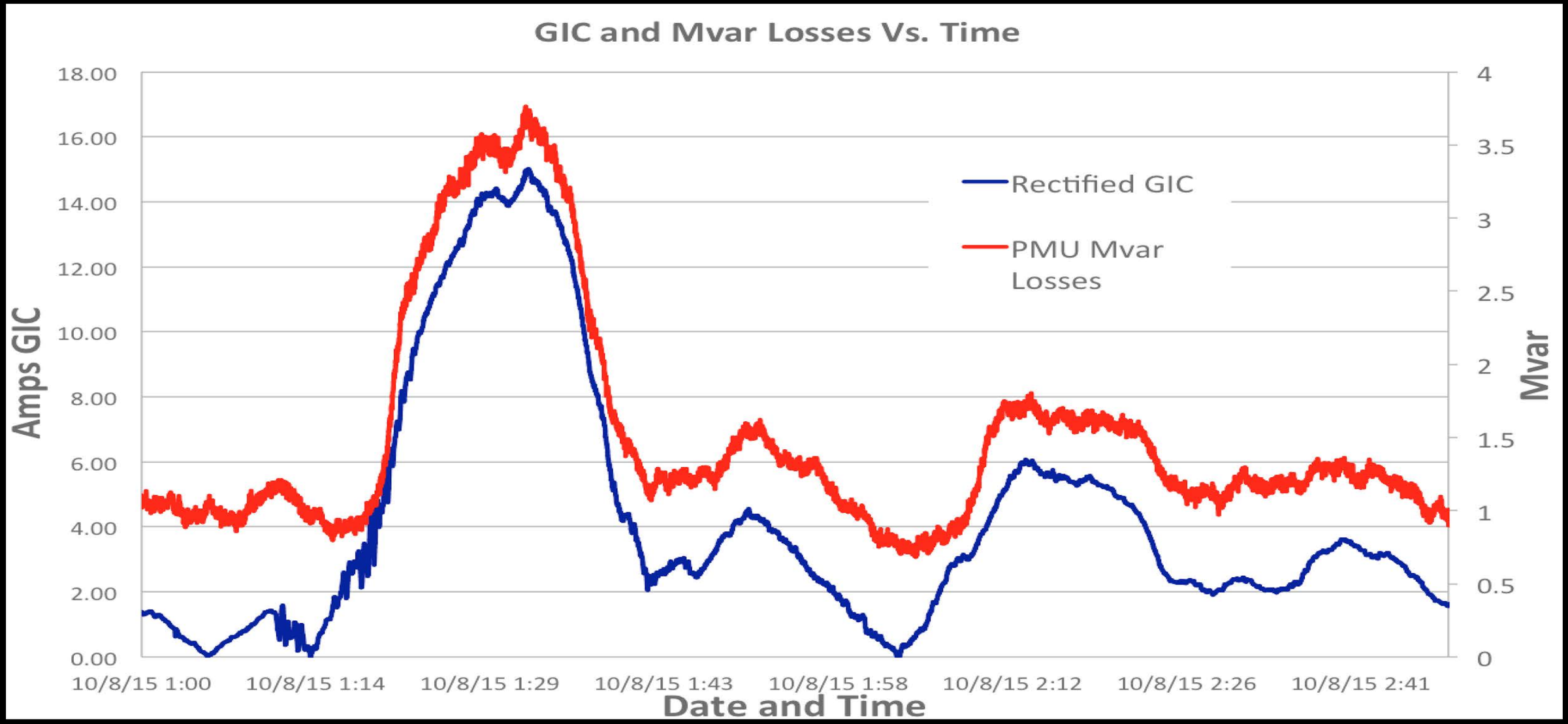
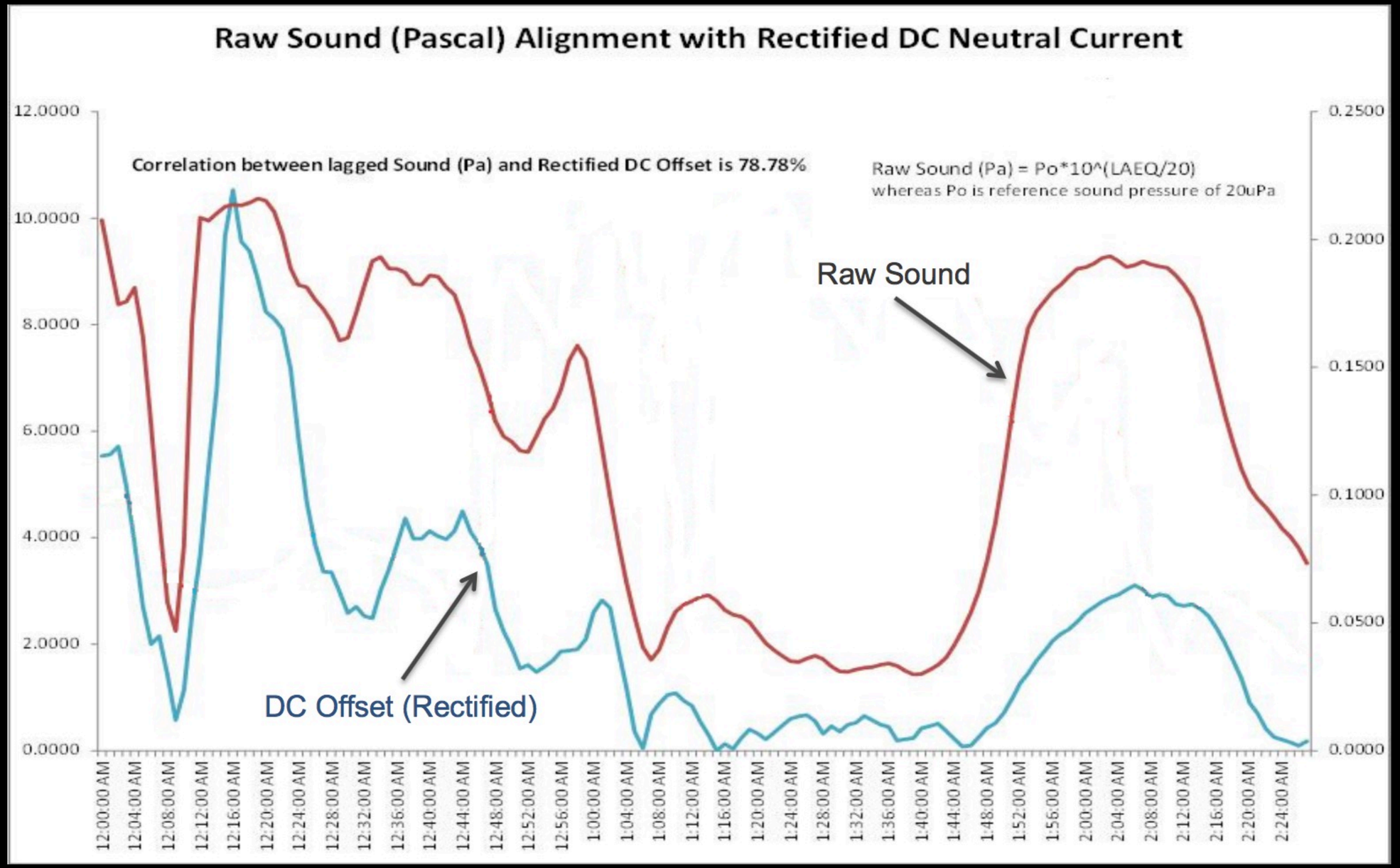
Correlation Between GIC and Geo-Electric Field



Correlating GIC and PMU Data

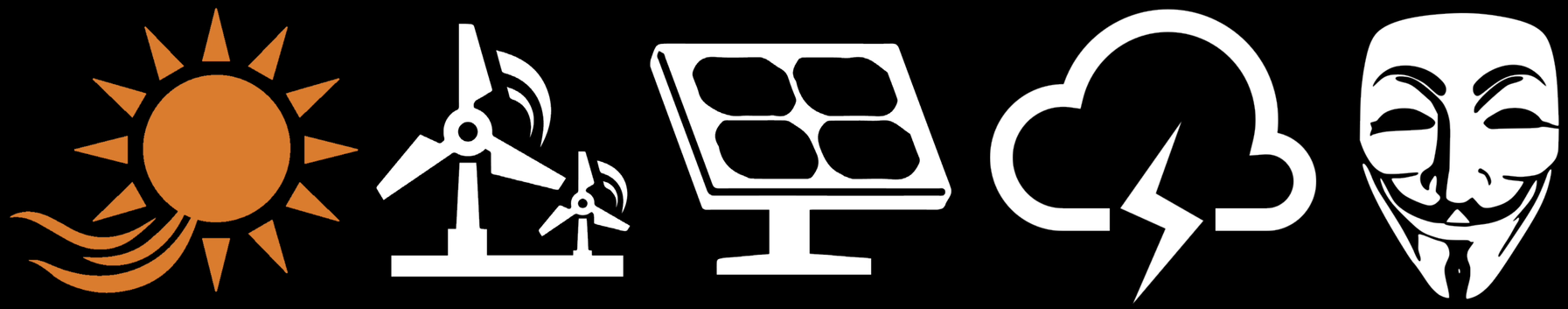


Correlating Transformer Audio during GIC Flow



EXPONENTIAL THREAT GROWTH

NATURAL PHENOMENA VS. MAN MADE



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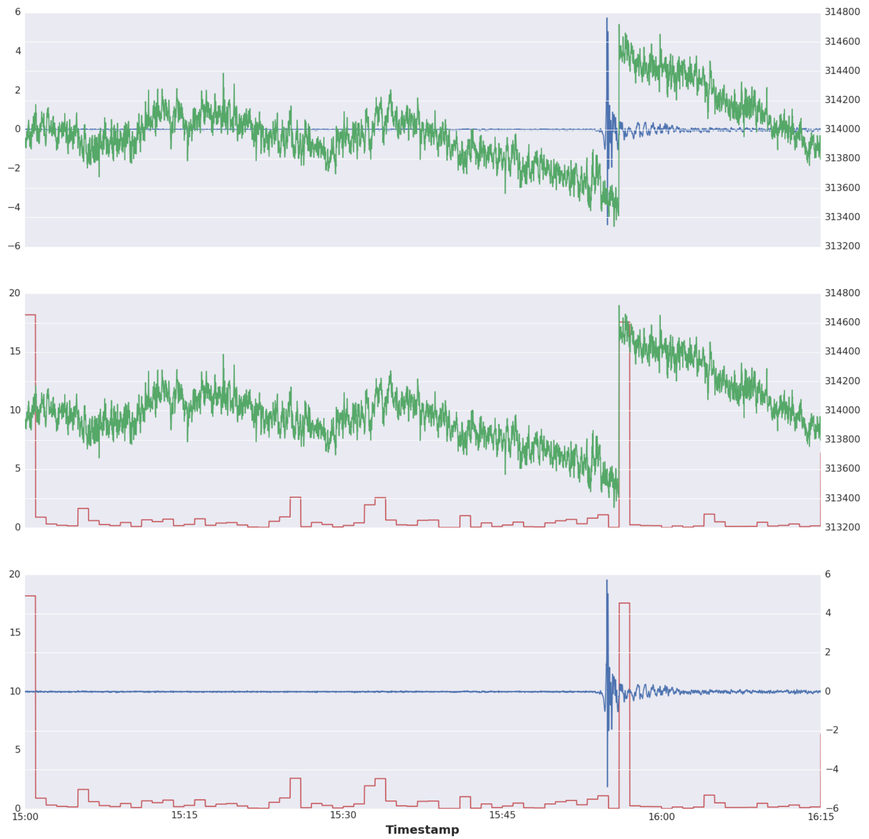
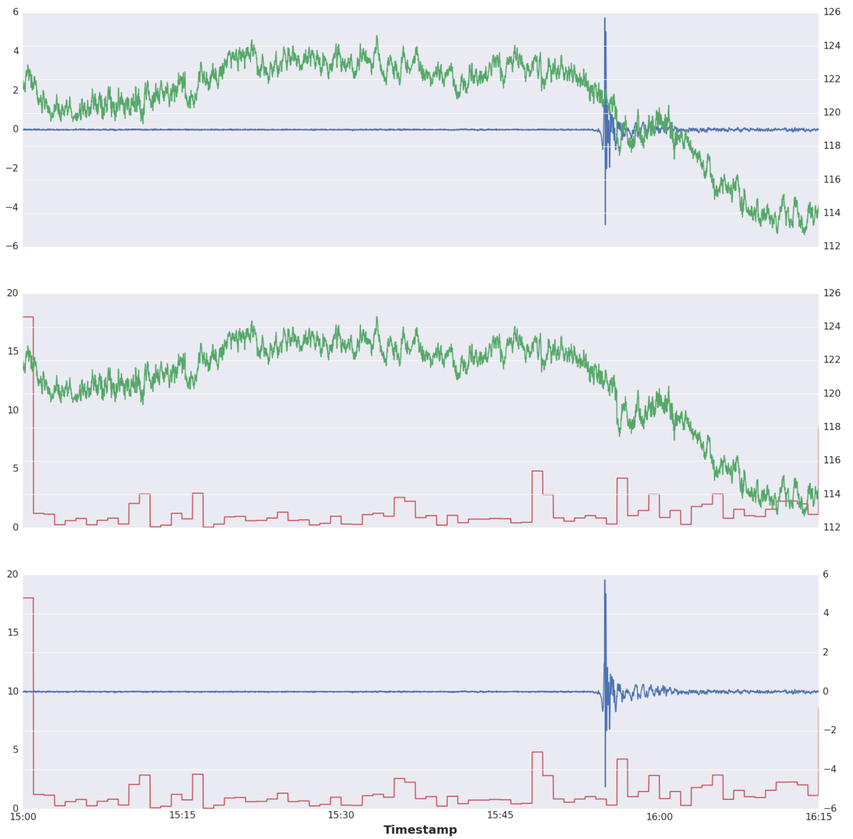
Generalized Anomaly Detection

Generalized Anomaly Detection





No Ground Truth

Blind to Location

Remote Magnetometer

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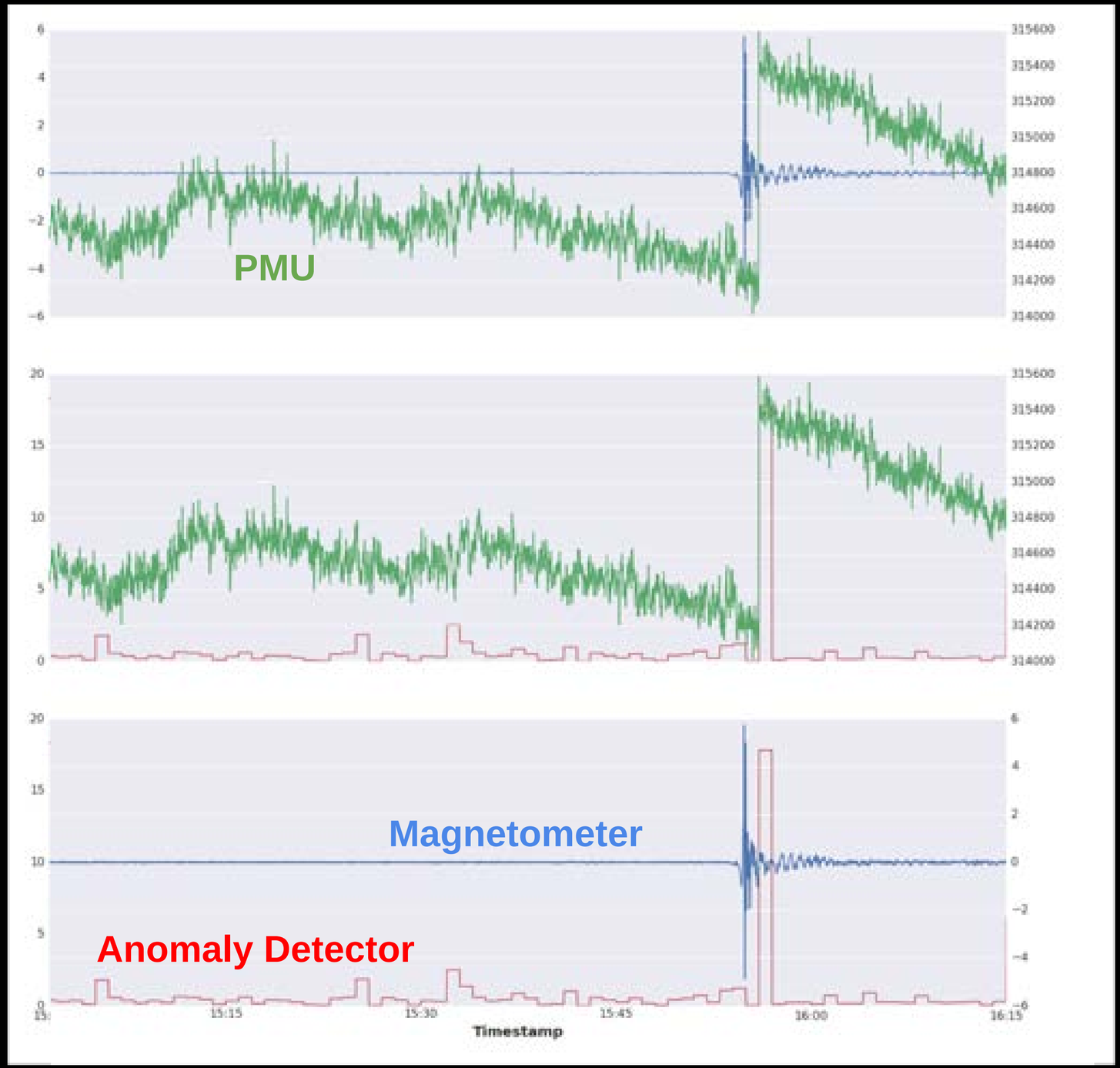
Anomaly Detection

Sept. 11, 2014	17 signal events
June 1, 2013	22 signal events
February 18, 2014	6+ signal events

The graph to the right demonstrates one of the signals that we find as likely indicative of something occurring related to the geomagnetic storm activity and strength at the time.

- Green - PMU data
- Blue - Magnetometer readings
- Red - PingThings anomaly detector

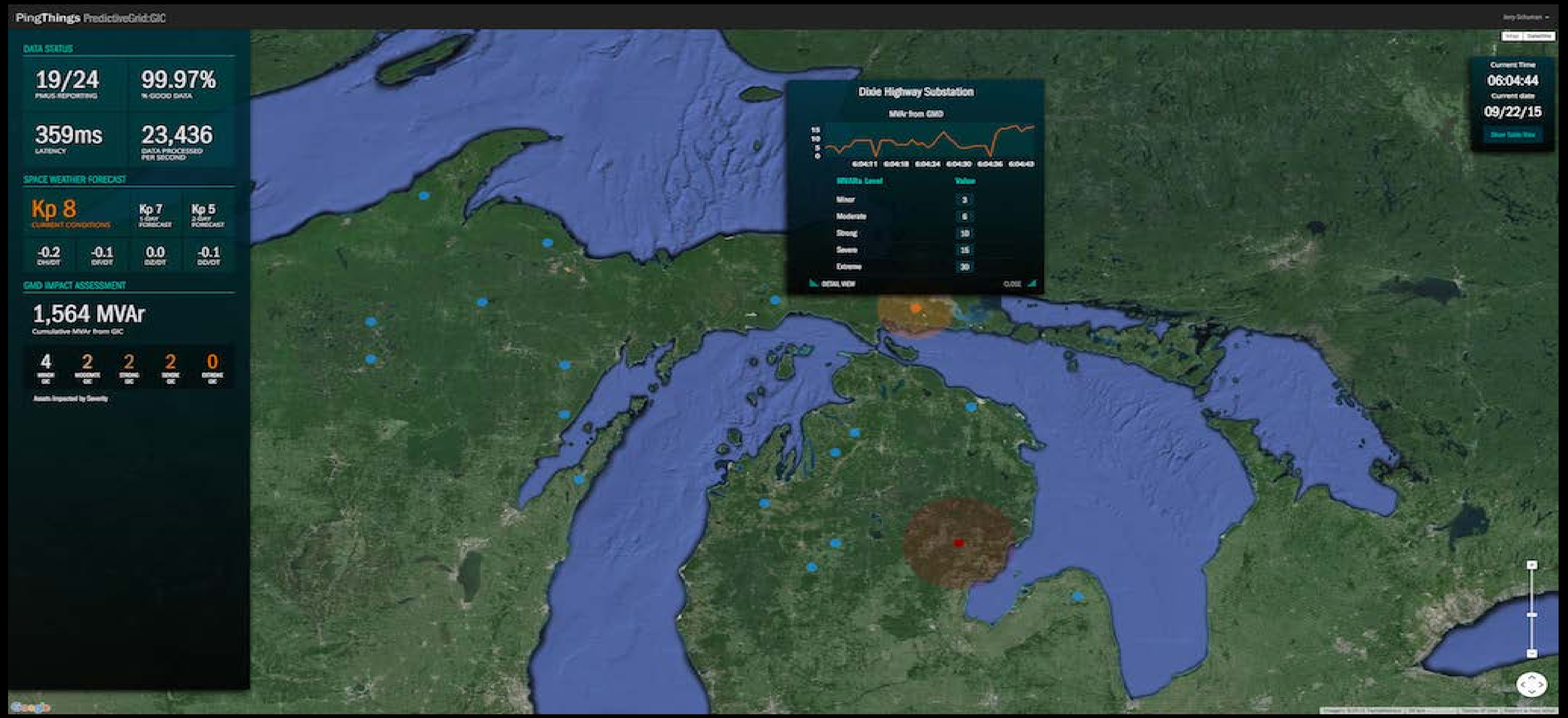


FERC Order #779 (Mandatory)

NERC Reliability Standard TPL-007-1

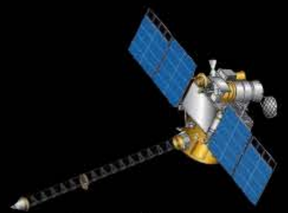
Presidential Executive Order

PredictiveGrid™



Identifies priorities for action, in advance, without field deployment.
Delivers actionable reports & alerts.

Software Stack



Space Weather

Utility data

USGS science for a changing world

Magnetometers

Data Providers

GLUON Management Layer

kafka

Spark

BTrDB

cassandra

RESTful API

GET PUT POST DELETE

node

python™

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ARPA-E µPMU Commercialization Project

Dr. Alexandra ‘Sascha’ Von Meier - CIEE

Dr. Emma Stewart - LBNL

Alex McEachern - PSL, Fellow - IEEE

Carl Blumstein - CIEE

Michael Anderson - University of California, Berkeley

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BERKELEY LAB
LAWRENCE BERKELEY
NATIONAL LABORATORY

ciee

PSL Power Sensors Ltd

Questions or Comments