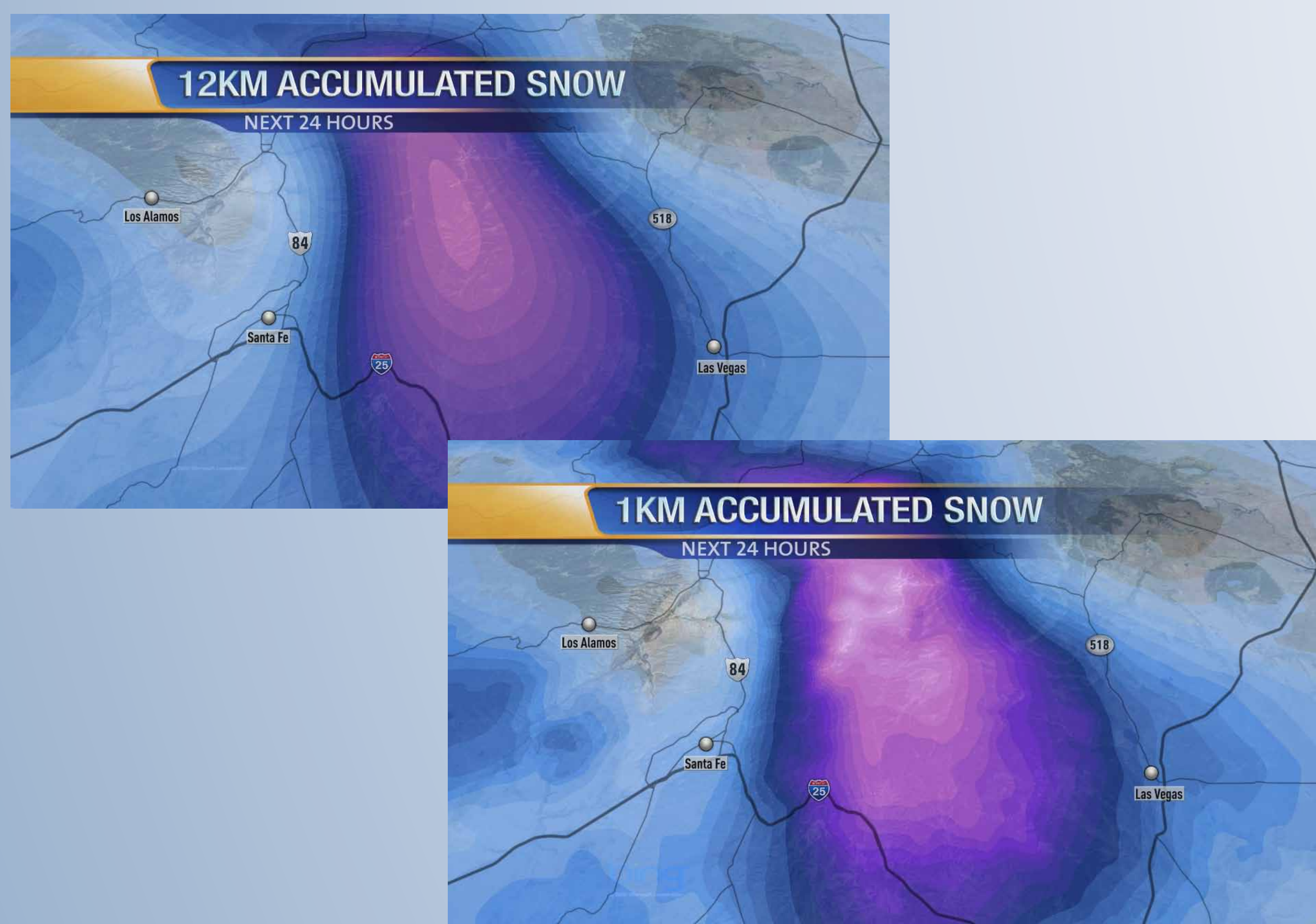# WEATHERCENTRAL™

DEVELOPMENT OF A GLOBAL DATA SERVER USING DOWNSCALING TECHNIQUES TO PRODUCE HIGH-RESOLUTION, LONG-RANGE, HOURLY FORECAST DATA

Holly C. Hassenzahl*, Brett A. Wilt, Chad Johnson, Rod Runnheim, Randy Arb, Andy Rice, Michal Thomas, Brian J. Good, Doug Graham, and Nicholas RR Keene
Weather Central, LLC, 401 Charmany Drive, Suite 200, Madison WI, 53719

INTRODUCTION

Weather Central has developed a revolutionary data storage and serving technology that distributes high-resolution, hourly forecast data for any location in the world, out to 384 hours. Downscaling techniques are applied to the company's proprietary weather model, Super MicroCast™, as well as to the GFS 004 and GEFS 003 models to make this possible. Real-time, updating datasets are now available through the DataCloud™ API in point (xml) and tile (image) formats


12 km (top) and 1 km (bottom) Accumulated Snow
North-Central New Mexico – December 2010

MOTIVATION

At Weather Central it is crucial to stay on the cutting edge of operational atmospheric modeling, while meeting the multi-faceted needs of customers throughout the world. Weather Central customers come from a wide range of industries, including: broadcast, internet, mobile, print, telematics, location-based services, renewable energy, construction, insurance, public safety, and sports and recreation. No matter the industry, *customers rely on data that is hyper-local, accurate, fast, up-to-date, and easy to access.* The global data server allows Weather Central to efficiently handle the terabytes of model data required to meet these needs.

RESULTS
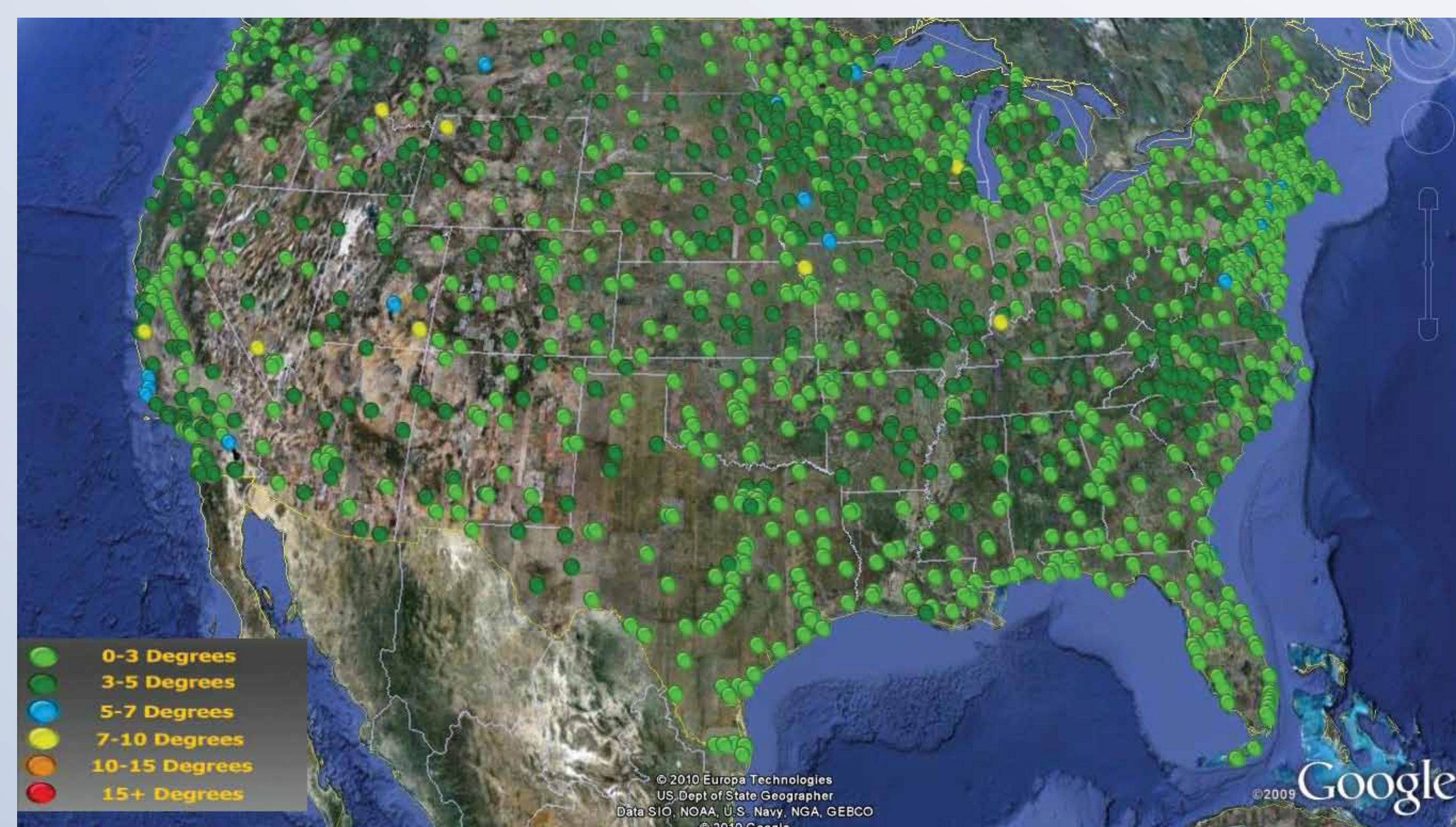
EASY ACCESS TO DATA FOR ANY LOCATION IN THE WORLD
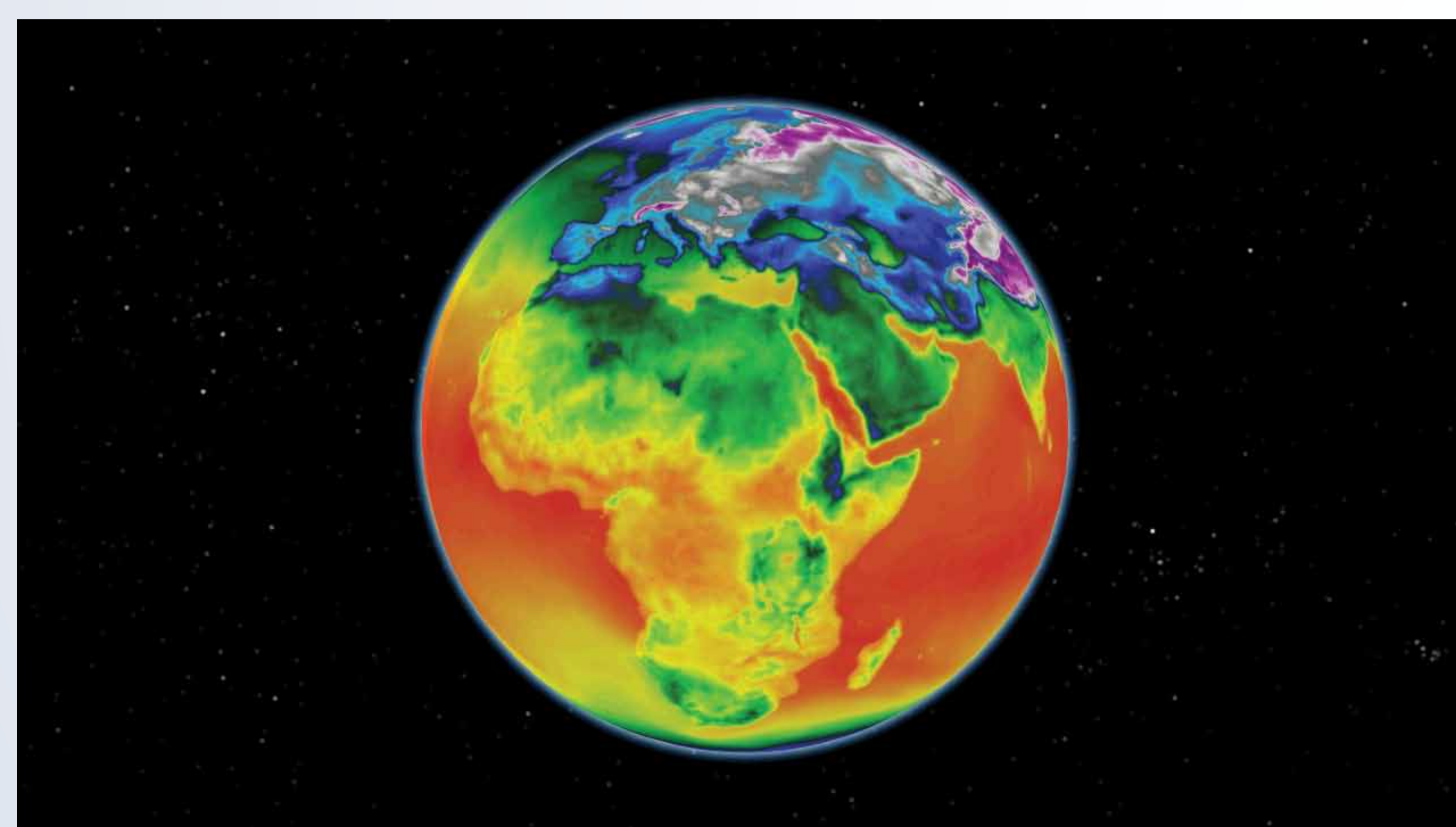
Global Forecast Temperatures
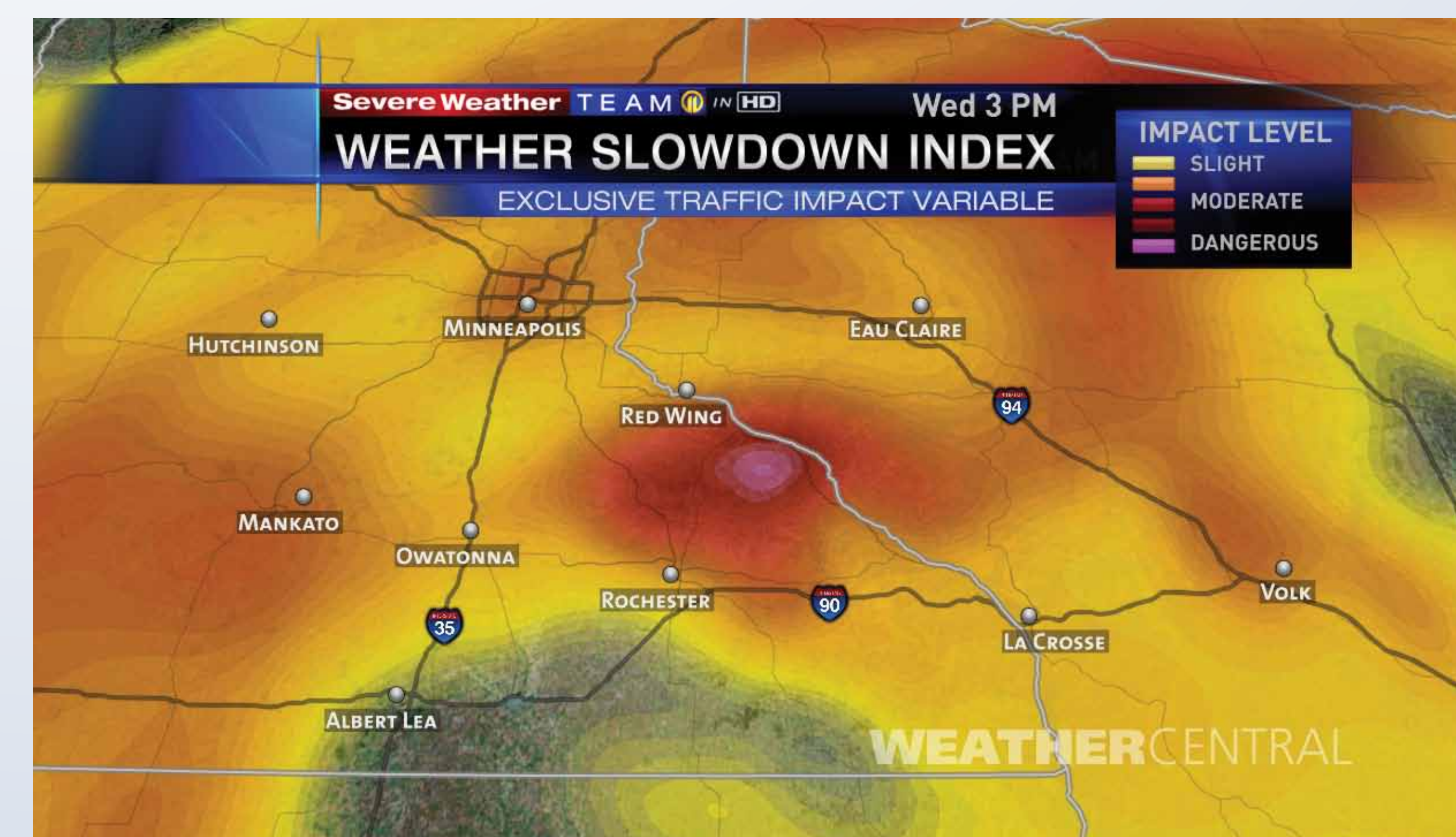Eastern Hemisphere – December 2010

HIGH RESOLUTION

1 km Forecast Temperatures
Seattle Area and Mount Rainier – December 2010

PROVEN ACCURACY

Accuracy of MOS-Corrected 1 km Max/Min Temperatures
10-day Average of Day 1 High, Day 2 Low, and Day 3 High

VALUE-ADDED VARIABLES

Traffic Slow-Down Due to Weather Impacts
Winter Storm over Southeast Minnesota – December 2010

PROCESS

» Global coverage is provided by the GFS 004 grid (0-180 hours) and the GEFS 003 grid (beyond 180 hours). Necessary variables are downscaled in time and space resulting in hourly, 0.25-degree resolution data

» In key locations, hourly forecasts are produced by 12 km Super MicroCast models out to 60 hours, then downscaled to 1 km through a combined dynamical and statistical approach

» Model output statistics (MOS) are applied to the 1 km temperatures to correct for model biases

» Blending techniques are performed to transition from the 1 km short-range model to the longer-range GFS model of lower resolution. The transition between the 004 and 003 grids at180 hours is also blended

» Upon receiving an API request, the DataCloud will dynamically choose the dataset with the highest possible resolution to be returned for the user-specified latitude and longitude.
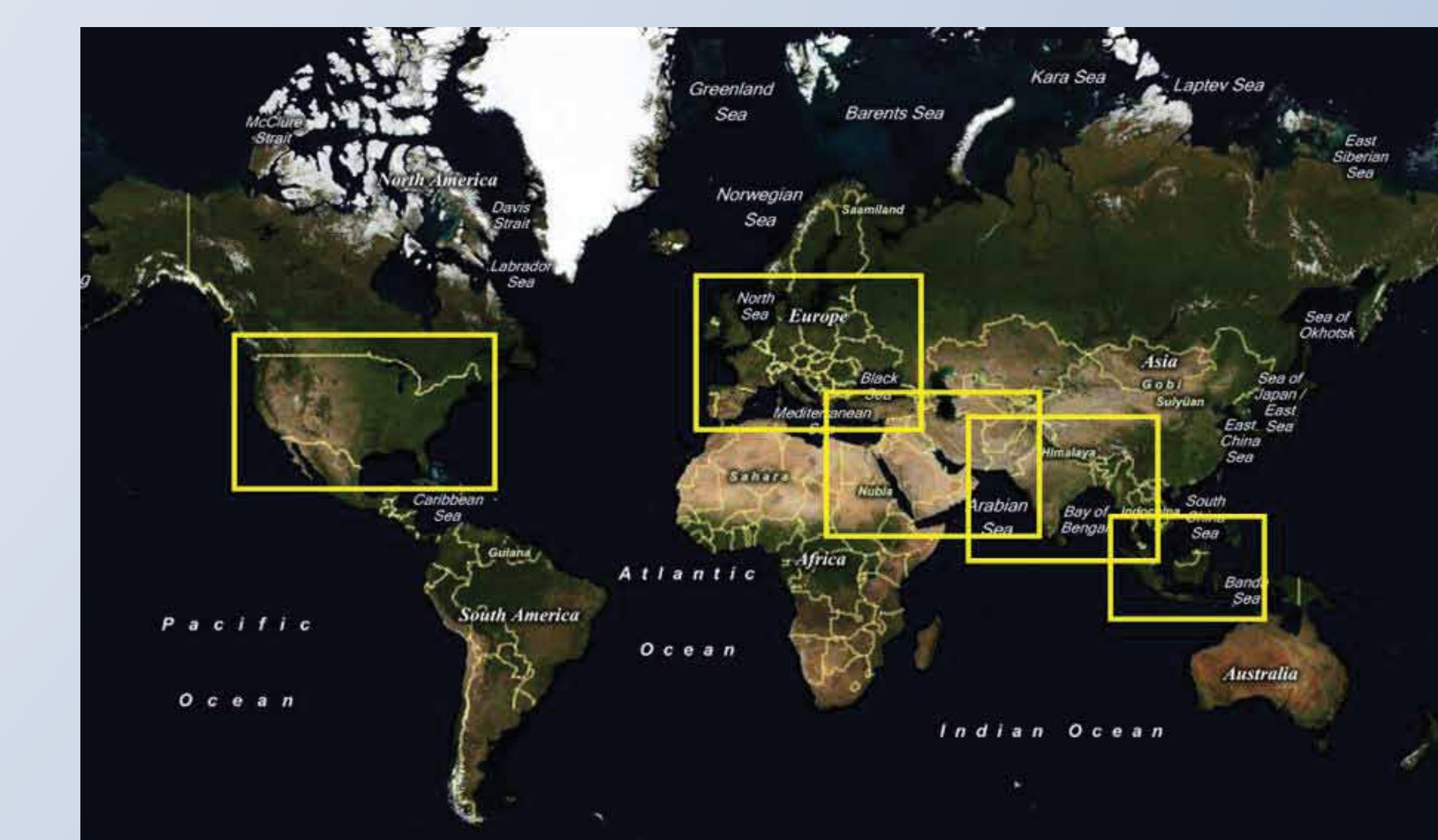
Location of 1 km Model Domains

CONCLUSION

Weather Central serves data to customers in many different industries around the world, all of whom are in need of accurate, easy-to-access, hyper-local data on a global scale. In order to handle the terabytes of model data per day needed to meet customers' needs, a next generation storage and serving technology was developed. This new data server tiles 384 hours of gridded grib data and distributes it to the user through the DataCloud API in point and tile formats.