

WEATHER RECONSTRUCTION



Enabling optimized design and forensic review based on site-specific reconstruction of weather history

For your project, it may be important to know what the weather was at a specific place and time, or what it has been over some longer period.

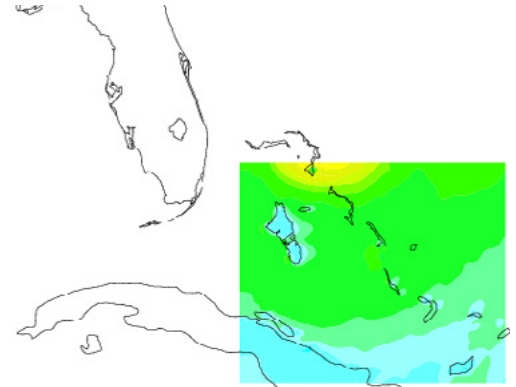
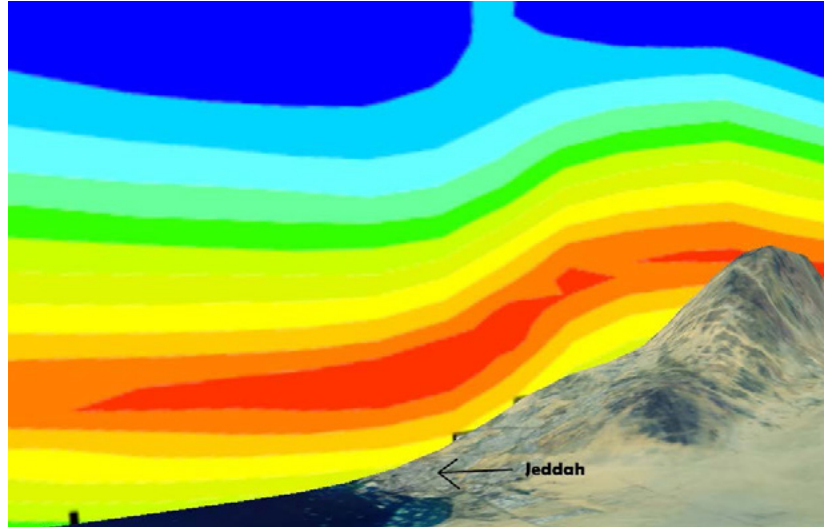
For example, you may need to...

- Determine the exact weather conditions at the time and place of an accident or event.
- Learn what expected and unlikely conditions your building or structure could experience.
- Accurately model how emissions from normal industry operations—or an emergency release—will disperse under likely weather conditions.

Our service

We use advanced modeling techniques to reconstruct past weather. The techniques are like those used to provide the nightly news forecast, but we use them to provide a historical picture of weather and climate.

However, compared to typical data provided by weather agencies, such as Environment Canada and the U.S. National Oceanic and Atmospheric Administration (NOAA), our methods produce data at a higher resolution in both time and space.



As a result, we can build up representative meteorological data for a specific site even when measured data don't exist at that exact location. With these methods, we can pinpoint weather conditions to within an hour and within a kilometer. Such reconstructions can cover a single day or periods reaching back 60 years or more.

We analyze, interpret and condense this complex weather data into simpler formats that are easy to understand and act on. And we always customize our approach and reporting to the context: environment assessment, sustainable design, building construction and many more.

RWDI is a
valuable
partner
to clients
seeking to...

Explore Innovations

- Push the boundaries of building energy performance by designing for site-specific daylighting, heating and cooling needs

Create Opportunities

- Anticipate future changes based on past weather trends at a specific location
- Improve industrial operating margins by understanding the weather conditions that affect safety, production or shipping

Meet Challenges

- Identify the contribution of weather to an accident or building damage

- Design buildings and infrastructure for extreme conditions (1 in 200 return periods)
- Anticipate and accommodate local-scale climate change resulting from changes in land use (e.g., construction of a reservoir, urban sprawl)

Fulfill Expectations

- Pursue regulatory permitting and environmental assessments with accurate data sets for modeling transport and diffusion of emissions

How we
work

We combine three-dimensional, limited-area meteorological modeling with advanced data analysis of observation data to provide high-resolution, site-specific reconstruction of past weather. With our models, we can provide spatial resolution to 1 kilometer at hourly intervals (or less) for periods from a day up to in excess of 60 years.

We use the state-of-the-science Weather Research and Forecasting Model (known as WRF-ARW). Our modeling is run on a very fine grid (~1 kilometer) using historical analyses from agencies such as the U.S. National Centers for Environmental Prediction. This modeling simulates the historical three-dimensional weather for any particular location or period of interest.

We can also incorporate different realizations of the surface geophysical fields in the model. With this strategy, we can represent human development of the earth's surface leading up to the time of interest. The resulting three-dimensional data fields can be provided in any format required for a particular application, such as for air quality modeling or for building energy studies. The data can also be statistically evaluated against actual observation.