

Spring 2022 - Speedwell Weather Gridded Data Background and Inventory

Background to Gridded Data

Gridded data is becoming more important for the index-based weather risk market and Speedwell Weather offers access to a wide and expanding choice of data series.

The term “Gridded data” can mean many things. At Speedwell we define gridded data as a geospatial dataset that has been produced via the interpolation of regular/irregular meteorological observations or reanalysis products. Reanalysis is a relatively young field in meteorology and is a product of the development in numerical forecast modelling which relies on establishing a uniform set of initial conditions to run the forecast. The inputs into these models may include observed data and satellite data and produce a multi-variate, spatially complete and coherent record of the global atmospheric / oceanic conditions.

The gridded data sets listed in the Inventory below are available for no additional charge to SuperPack® Premium users on a reasonable request basis. We are continuously adding gridded data and this catalogue will therefore be updated on a regular basis.

These data sets can be accessed directly by users of the Speedwell Weather System via API. Alternatively, gridded data requests can be made directly to the Speedwell Data Team (datateam@speedwellweather.com) for FTP delivery or via API.

For information relating to the provision of Settlement Data based on gridded data from Speedwell Settlement Services, please see [Using Gridded Data for Settlement](#)

Understanding the Limitations of Gridded Data

It is important that gridded data is not seen as a “magic bullet” that solves all data needs. The effective use of gridded data depends on a deep understanding of how it is created and its possible limitations. Speedwell Weather have produced a number of papers providing detailed information on a number of data sets. Please contact us to request these documents.

Gridded Data Settlement Data

Settlement Data is weather data used to calculate the value of a weather index on which a weather protection contract has been based.

Speedwell Settlement Services Limited is a major provider of Settlement Data and has been involved in a wide range weather risk transactions including energy market hedges, event insurance, exchange traded products and the largest weather transactions on record. Settlement Data can be produced for gridded datasets.

The role of Speedwell Settlement Services in any weather transaction is:

- To define the process, data quality, data source, delivery cycle and methods used to address errors and missing data in a Settlement Contract. This ensures total transparency in the process.
- To provide a feed of data to the counterparties during the life cycle of the contract term. The data supplied is with no missing data points and gross errors removed with notifications issued to all parties for transparency.
- At the end of the contract term, to provide the final Settlement Data (Index) to all counterparties at the same time along with an accompanying Settlement Certificate to enable any payout to be calculated, documented and actioned.

Please contact us for more information: Support@SpeedwellSettlementServices.com

Speedwell Weather Gridded Data Inventory

Speedwell are continuously adding gridded data and this catalogue will therefore be updated on a regular basis, if there are reanalysis products that you would like to see added to this inventory, please contact us

The list of products for each of the following gridded datasets/providers can be found by following the links below:

- [ARC2](#) - NOAA Climate Prediction Center (CPC) African rainfall estimates
- [BOM](#) - Bureau of Meteorology (Australia) various hi-res elements based upon ground observations
- [CHIRPS 2.0](#) - Climate Hazards Group (CHG) precipitation estimates using cloud top temperature
- [DWD](#) - Deutscher Wetterdienst hi-res rainfall product using gauge data
- [ECMWF ERA5](#) - ERA5 global reanalysis from 1950 to recent, numerous elements
- [ECMWF ERA Interim](#) - (ceased production Aug 2019)
- [EOS](#) - Earth Observation System MODIS Vegetation Index (NDVI) - global land coverage
- [MERRA 2](#) - global reanalysis from 1980 to recent, numerous elements
- [NOAA CPC](#) - Climate prediction Centre Gauge-Based Analysis of Global Daily Precipitation
- [PRISM](#) - US hi-res precipitation and temperature datasets
- [UK Met Office](#) - Global Sea Surface Temperature dataset

ARC2 - NOAA Climate Prediction Center (CPC)

Description: Africa region rainfall climatology using 3 hourly infrared satellite imagery (EUMETSAT) and hourly/24 hour rainfall totals from WMO reporting rain gauges (GTS)

Earliest Data: 1983-01-01

Latest Data: 3 days ago

Data Element Name	HR	Region / Resolution	Daily / Hourly	Units
Rain	N	Africa: 0.1(~10) x 0.1(~10) degrees(km)	Daily	mm

HR = Speedwell derived high resolution product

Y = available

N = not available

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Bureau of Meteorology (Australia)

Description: Reanalysis of quality controlled surface rainfall and temperature observations, projected to a regular grid. Solar data comes from satellite based observations, projected to a regular grid. Series is revised over time as further improvements in data quality are applied

Earliest Data: Rain 1900-01-01, Temperature 1911-01-01, Solar 1990-01-01

Data Element Name	HR	Region / Resolution	Daily / Hourly	Units
Rain	N	Australia: 0.05(5) x 0.05(5) degrees (km)	Daily	mm
Solar Radiation	N	Australia: 0.05(5) x 0.05(5) degrees (km)	Daily	MJ/m ²
Temperature Maximum	N	Australia: 0.05(5) x 0.05(5) degrees (km)	Daily	C
Temperature Minimum	N	Australia: 0.05(5) x 0.05(5) degrees (km)	Daily	C

HR = Speedwell derived high resolution product

Y = available

N = not available

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CHIRPS 2.0 - Climate Hazards Group (CHG)

Description: A global rainfall estimate, derived from satellite imagery using algorithms to estimate rainfall at the surface based upon cloud top temperatures

Earliest Data: 1981-01-01

Latest Data: 6 days ago

Data Element Name	HR	Region / Resolution	Daily / Hourly	Units
Rain	N	Global: 0.05(5) x 0.05(5) degrees (km)	Daily	mm

HR = Speedwell derived high resolution product

Y = available

N = not available

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Deutscher Wetterdienst (DWD)

Description: German gridded daily rain constructed using interpolation of all daily precipitation data available at the DWD (Deutscher Wetterdienst) over Germany from 1931 to present at a resolution of 1kmx1km.

Earliest Data: 1931-01-01

Latest Data: 2 days ago

Data Element Name	HR	Region / Resolution	Daily / Hourly	Units
Rain	N	Germany: 0.01(1) x 0.01(1) degrees (km)	Daily	mm

HR = Speedwell derived high resolution product

Y = available

N = not available

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ERA5

Description: ERA5 is produced using 4DVar data assimilation in CY41R2 of ECMWF's Integrated Forecast System (IFS), with 137 hybrid sigma/pressure (model) levels in the vertical, with the top level at 0.01 hPa

Earliest Data: 1979-01-01 (* extending back to 1950-01-01 during 2020/1 from ECMWF)

Latest Data: Generally 7 days ago (except for Evapotranspiration which has 3 month lag)

Data Element Name	HR	Region / Resolution	Daily / Hourly	Units
Dew Point Temperature 2m *	N	Africa: 0.25(~25) x 0.25(~25) degree (km)	Hourly	K
Dew Point Temperature 2m *	N	Asia: 0.25(~25) x 0.25(~25) degree (km)	Hourly	K
Dew Point Temperature 2m *	N	CONUS: 0.25(~25) x 0.25(~25) degree (km)	Hourly	K
Dew Point Temperature 2m *	N	Europe: 0.25(~25) x 0.25(~25) degree (km)	Hourly	K
Dew Point Temperature 2m *	N	S America: 0.25(~25) x 0.25(~25) degree (km)	Hourly	K
Evapotranspiration	N	Africa: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m
Evapotranspiration	N	Asia: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m
Evapotranspiration	N	CONUS: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m
Evapotranspiration	N	Europe: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m
Evapotranspiration	N	S America: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m
Rain *	N	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m
Snow Depth	N	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m
Solar Radiation	N	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	J m ²
Temperature 2m *	N	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	K
Temperature Maximum *	N	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	K
Temperature Minimum *	N	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	K
Volumetric Soil Water Layer 1	N	Africa: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 2	N	Africa: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 3	N	Africa: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 4	N	Africa: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 1	N	Asia: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 2	N	Asia: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 3	N	Asia: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 4	N	Asia: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 1	N	CONUS: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 2	N	CONUS: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 3	N	CONUS: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 4	N	CONUS: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 1	N	Europe: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 2	N	Europe: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 3	N	Europe: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 4	N	Europe: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 1	N	S America: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 2	N	S America: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 3	N	S America: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Volumetric Soil Water Layer 4	N	S America: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m3/m3
Wave Direction	Y	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	degrees
Wave Significant Height of Wind Waves	Y	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m
Wave Significant Height of Swell	Y	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m
Wave Period	Y	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	s
Wind Direction 10m	N	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	degrees
Wind Direction 100m	N	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	degrees
Wind Speed 10m	N	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m/s
Wind Speed 100m *	N	Global: 0.25(~25) x 0.25(~25) degree (km)	Hourly	m/s

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Y = available

N = not available

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ERA Interim

Description: The data assimilation system used to produce ERA-Interim is based on a 2006 release of the IFS (Cy31r2). The system includes a 4-dimensional variational analysis (4D-Var) with a 12-hour analysis window. This reanalysis product is no longer produced by ECMWF, it is replaced by the ERA5 reanalysis project.

ERA Interim elements have now been removed from the catalogue, please see ERA5, which is the replacement reanalysis.

Should you still require data from the ERA Interim project, then please contact the Speedwell Data Team (datateam@speedwellweather.com) as we may be able to extract data on a per request basis (additional costs may be involved).

ECMWF ERA Interim

Earliest Data: 1980-01-01

Latest Data: 2019-08-31 (Project replaced by ERA5)

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Earth Observation System (EOS)

Description: Global 16-day composite of the MODIS Vegetation Index (NDVI) included in the MOD13C1 product

Earliest Data: 2000-02-18

Latest Data: 1 month ago

Data Element Name	HR	Region / Resolution	Daily / Hourly	Units
NVDI : MOD13C1	N	Global: 0.05(5) x0.05(5) degrees (km)	16 days	NDVI

HR = Speedwell derived high resolution product

Y = available

N = not available

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MERRA 2

Description: The second Modern-Era Retrospective analysis for Research and Applications (MERRA-2) is a NASA atmospheric reanalysis, using an upgraded version of the Goddard Earth Observing System Model, Version 5 (GEOS-5) data assimilation system.

Earliest Data: 1980-01-01

Latest Data: 1.5 months ago

Data Element Name	HR	Region / Resolution	Daily / Hourly	Units
Precipitation	N	Africa: 0.625 x 0.500 degrees Asia 0.625 x 0.500 degrees Australia 0.625 x 0.500 degrees Europe 0.625 x 0.500 degrees USA 0.625 x 0.500 degrees	Hourly	mm
Wind Speed 10m, 50m, 60m, 70m, 80m, 90m, 100m, 110m, 120m, 130m, 140m, 150m	N	Africa: 0.625 x 0.500 degrees Asia 0.625 x 0.500 degrees Australia 0.625 x 0.500 degrees Europe 0.625 x 0.500 degrees USA 0.625 x 0.500 degrees	Hourly	m/s

HR = Speedwell derived high resolution product

Y = available

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NOAA Climate prediction Centre (CPC)

Description: CPC Unified Gauge-Based Analysis of Global Daily Precipitation Project, constructed using available ground based observations. Since 2019 periodic updates (revision of the real-time product) are available with a 2-3 month lag.

Earliest Data: 1979-01-01 (1948-01-01 for CONUS)

Data Element Name	HR	Region / Resolution	Daily / Hourly	Units
Rain	N	Global: 0.5(~50) x 0.5(~50) degrees (km)	Daily	mm
Rain	N	CONUS: 0.25 (~25) x 0.25 (~25) degrees (km)	Daily	mm

HR = Speedwell derived high resolution product

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PRISM

Description: PRISM is a set of monthly, yearly, and single-event gridded data products of mean temperature and precipitation, max/min temperatures, and dewpoints, primarily for the United States. In-situ point measurements are ingested into the PRISM (Parameter elevation Regression on Independent Slopes Model) statistical mapping system. The PRISM products use a weighted regression scheme to account for complex climate regimes associated with orography, rain shadows, temperature inversions, slope aspect, coastal proximity, and other factors. Climatologies (normals) are available at 30-arcsec (800 meters) and monthly data are available at 2.5 arcmin (4 km) resolution. PRISM is the USDA's official climatological data.

Data Element Name	HR	Region / Resolution	Daily / Hourly	Units
Precipitation	N	Mainly US—4km	Daily	mm
Maximum Air	N	Mainly US—4km	Daily	° C
Minimum Air	N	Mainly US—4km	Daily	° C

HR = Speedwell derived high resolution product

Y = available

N = not available

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UK Met Office

Description: Global SST & Sea Ice Analysis, L4 OSTIA, 0.05 deg daily

Earliest Data: 2007-01-01

Latest Data: 2 days ago

Data Element Name	HR	Region / Resolution	Daily / Hourly	Units
Sea Surface Temperature : L4 OSTIA	N	Global: 0.05(5) x0.05(5) degrees (km)	Daily	K

HR = Speedwell derived high resolution product

Y = available

N = not available

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