

General

Use of weatherfiles allows definition of various weather situations.

Note that the weather is always 'global' – that is, the weather is the same for all locations within a simulation. It may vary over time but it can not vary based on location.

Presently, use of weatherfiles is restricted to timetable mode. The reason for this is that there are other ways to influence the weather in activity mode (through special waitingpoints). Having two independent ways to set weather will obviously not work and would only cause chaos.

Note that wind characteristics are independent and cannot be defined through parameters in the weatherfiles.

Definition

The required weather settings are defined in weatherfiles.

The format for weatherfiles is JSON, format is detailed below.

The file extension must be '**weather-or**'. The files must be placed in a subdirectory named '**WeatherFiles**', located in the route's main directory.

Selection

Weatherfiles can be selected in the main menu window. There is no default setting.

The menu will check the directory for weatherfiles as defined above, and will offer a list of available files from which the required file can be selected.

If no weatherfiles are available or none is selected, the normal default weather will be used.

Interaction between 'Season', 'Weather' and 'Weatherfile'

Note that selection of '**season**' and '**weather**' in the menu will not affect the selection of '**weatherfiles**'. Nor will these settings affect the weather as defined in the selected weatherfile.

For instance, if the selected '**season**' is '*summer*', and '**weather**' is '*clear*', but the selected weatherfile defines precipitation in the form of snow, then there will be snowfall.

However, the texture selection for surfaces and buildings will still be determined by the selection of '**season**' and '**weather**', and not by the definition of the weather in the selected weatherfile.

It is up to the user to ensure that the selection of '**season**' and '**weather**' matches with the intended environment for the selected weatherfile.

File format

The fileformat for the weatherfile is text file with definitions according to JSON defined format.

Main format (note : quotes in the text below must be included in the actual text) :

```
{
    "Changes" : [
        <weather definitions>
    ]
}
```

Weather definitions

```
{
    "Type": "<type definition>"
    "Time": "<time definition>"
    <weather type definitions>
},
.....
```

Type definition

Clear *or* Precipitation *or* Fog

Time definition

HH:MM

Weather type definitions

Weather type definitions depend on the defined type. See below for full details.

Format : "name": "value"

Weather definitions

General

Each weather definition has a set of parameters defining that particular weather, as well as possible variation in characteristics which define that weather. If applicable, there are also parameters which define the time required to change over from the previous weather type, or to change to the next defined weather type.

Note that weather time settings are defined between 00:00 and 23:59 (using 24 hour clock).

For timetables which run beyond midnight it is not possible to change the weather after midnight.

The parameters "Type" and "Time" are compulsory. Most other parameters are optional, these will either have a default value or a random value will be used.

To simulate the unpredictable nature of weather, the values of many parameters will be randomized within a bracket of 10 – 20 % even if defined.

Clear weather

Clear weather is weather with no precipitation and normal visibility.

The characteristics that can be set for clear weather are cloud cover, variation in cloud cover and visibility.

Definitions :

Overcast : percentage cloud cover, value 0 – 100%, default is random value.

OvercastVariation : variation in cloud cover, value 0 – 100%, default is random value.

OvercastRateOfChange : rate of change for the variation in cloud cover, value 0 – 1, default is random value.

This variable is an indicative value only, the max. rate of change is a full change to the maximum variation in about 5 mins.

Visibility : max. visibility, value 1000 – 60000m, default 60000m.

Visibility is constant. For smaller values, use the fog setting.

Precipitation

Precipitation can either be rain or snow.

Characteristics for precipitation cover the precipitation itself as well as the way in which the changeover from previous and following weather type takes place.

Type of precipitation .

Definition :

PrecipitationType : “Rain” or “Snow”, this value is compulsory.

Duration, spread and probability of precipitation.

An important aspect of the precipitation definition is that the precipitation does not have to occur all the time during the full selected period. Both the probability of actual precipitation at any one time, as well as the total number of periods with actual precipitation can be defined.

Definitions :

PrecipitationProbability : chance of precipitation at any one time, value 0 – 100%, default is random value.

PrecipitationSpread : actual periods of precipitation during selected time, value n with $n \geq 1$, default value is 1.

The setting of these parameters determine whether there is a single, continuous spell of precipitation or if there is a more showery type of weather.

If PrecipitationProbability == 100, there is just a single, continuous period of precipitation during the full selected time.

If PrecipitationSpread == 1, there is also just a single period, but the length of this period in relation to the selected time will depend on the value of PrecipitationProbability, higher values for PrecipitationProbability will give a longer period of precipitation.

If PrecipitationSpread > 1, the precipitation will be in showers. High value for PrecipitationProbability combined with low value for PrecipitationSpread will result in a few, but lengthy showers, whereas a low value PrecipitationProbability and a high value for PrecipitationSpread will result in a number of short showers with lengthy clear spells in between.

Definition of precipitation.

For the precipitation itself, the density, variation and rate of change for variation can be defined, as well as the visibility.

Definitions :

PrecipitationDensity : required maximum density, value 0 – 1, default is random value.

This is a scale value, the actual values are defined in the program.

PrecipitationVariation : variation in density, value 0 – 1, default is random value.

This is a scale value, actual variation is defined in the program. Note that the density will never exceed the maximum value as defined in PrecipitationDensity.

PrecipitationRateOfChange : rate of change of the precipitation density, value 0 – 1, default is random value.

PrecipitationVisibilityAtMinDensity : visibility when density is at minimum value, value 100 - 60000m, default is 20000m. Note that this value must be less or equal to the visibility defined for clear spells (OvercastVisibility).

PrecipitationVisibilityAtMaxDensity: visibility when density is at maximum value, value 100 - 60000m, default is 10000m. Note that this value must be less or equal to the visibility at minimum density (PrecipitationVisibilityAtMinDensity).

Build up to precipitation.

The parameters below define the transition period between clear spells and periods with precipitation. This applies to the actual start of a precipitation period as well as the changeover between a clear spell and precipitation within a precipitation period.

Note that the first start up period will never start before the actual start time, so actual precipitation will always start later than the start time as defined.

This period is split into two parts. First, the cloud cover will increase until it has reached the cover percentage at which precipitation will start. Precipitation will always start at the minimum density, it will increase to the required density over the period as defined in the parameters.

Definitions :

OvercastPrecipitationStart : the required cloud cover percentage at which precipitation will start, value 0 – 100%, default random.

This is also the cloud cover percentage during the precipitation period. This value must be equal or greater than the cloud cover as defined for clear spells (Overcast).

OvercastBuildUp : the rate of change in cloud cover during build up preceding precipitation, value 0 - 1, default is random value.

PrecipitationStartPhase : time it takes for precipitation to reach the required density, value 30 - 240 secs, default 30 secs.

End of precipitation.

The parameters below define the transition period between periods with precipitation and clear spells, both during the precipitation period as well as at the end.

This period is split into two parts. First, the precipitation density will decrease from the actual density to the minimum density. The precipitation will stop when it has reached the minimum density, then the cloud cover will disperse until it has reached the required cover for clear spells or for the next defined weather.

Definitions :

PrecipitationEndPhase : time it takes for precipitation to decrease to the minimum density, value 30 - 300 secs, default 30 secs.

OvercastDispersion : rate of change for cloud cover to decrease to required level at clear spells, value 0 – 1, default is random value.

Clear spells.

The parameters for a clear spell during precipitation are similar to those for clear weather, defining cloud cover (Overcast), variation in cloud cover (OvercastVariation), rate of change for this variation (OvercastRateOfChange) and visibility (OvercastVisibility).

See above for definition of these parameters.

Fog

Fog can be used to define weather with a visibility less than 1000m. Fog is constant, there is no variation in visibility or cloud cover.

Definitions :

FogVisibility : visibility during fog, value 10 – 1000m, default 1000m.

FogSetTime : time for fog to set from present visibility to required fog visibility, value 300 – 3600 sec, default value 300 sec.

Fog will start to set at start time of fog period.

FogLiftTime : time for fog to lift from minimal visibility to visibility as required for next weather type, value 300 – 3600 sec, default value 300 sec.

The fog will start to lift at such a time that it has cleared to the required visibility at the start time of the next weather type.

FogOvercast : cloud cover during fog set and lift period, value 0 – 100%, default is random value.