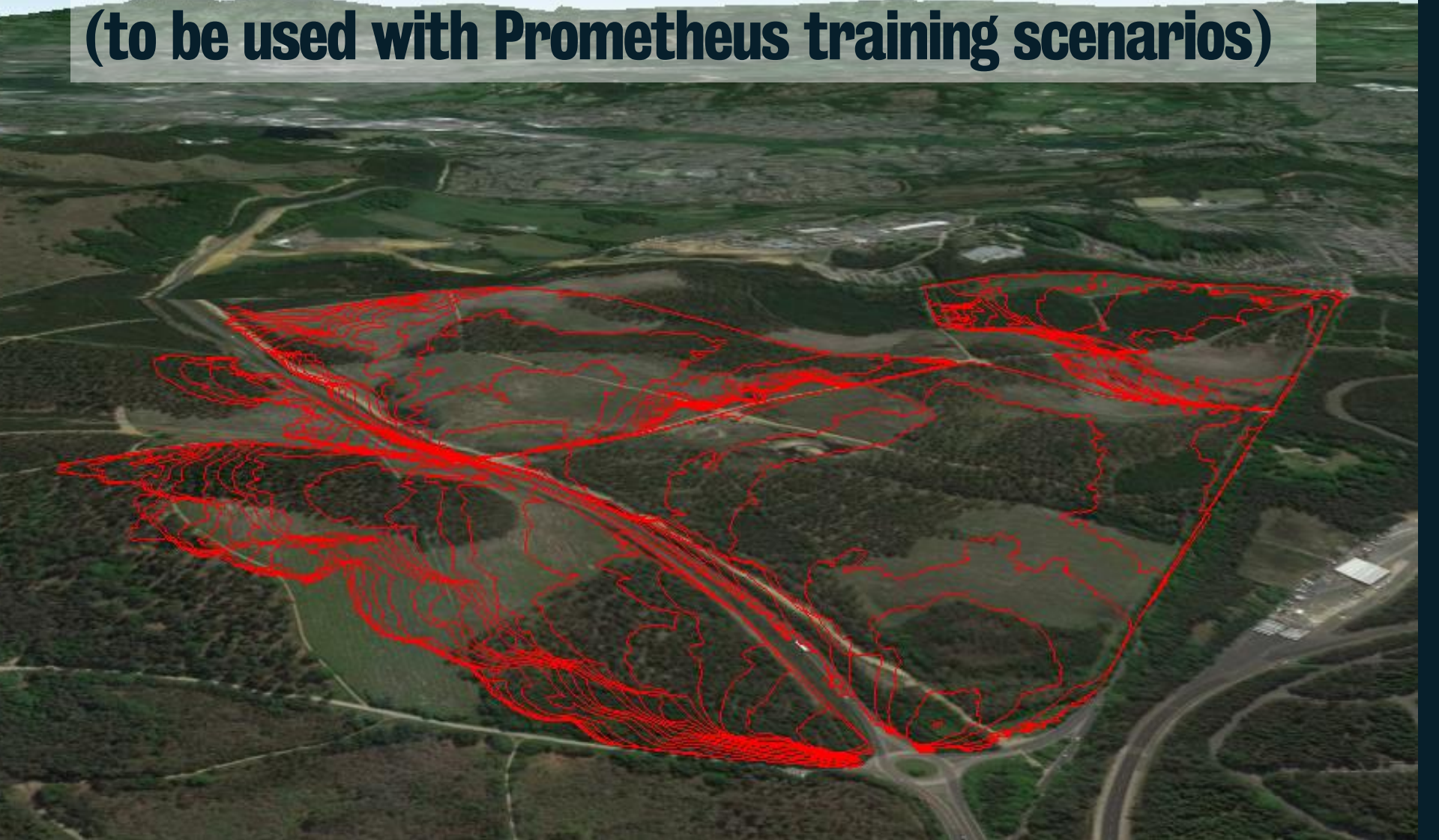# WILDFIRE PREDICTION SYSTEM (WPS) SIMULATIONS
(to be used with Prometheus training scenarios)

SIMPLE MODEL 1: NO WIND OR SLOPE
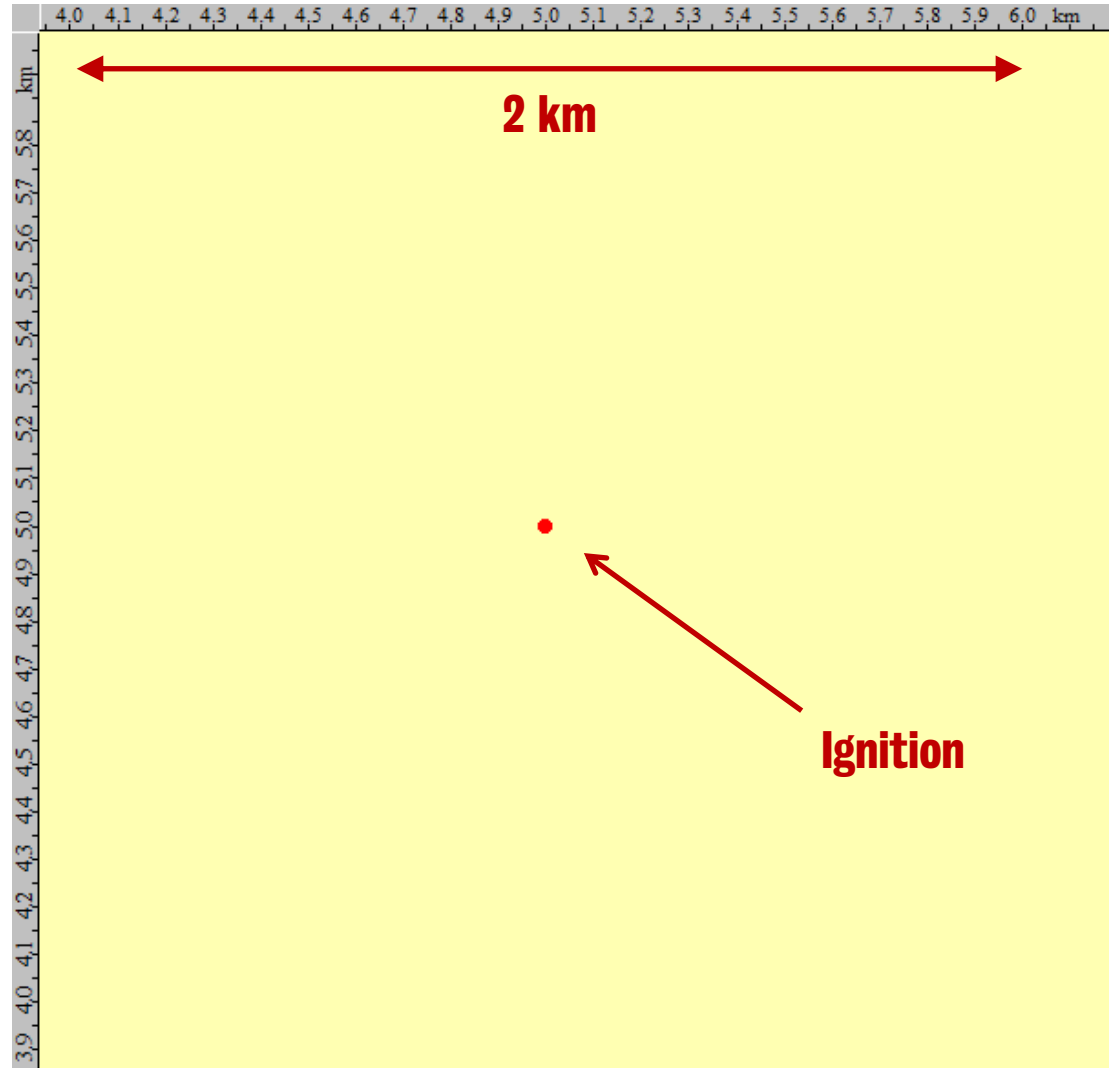
Open Simulation

1 – NoWindNoSlope.fgm

- No wind   [0 m/s]

- No slope   [0°]

- 30% relative humidity

- Uniform fuel (dry grass)

- Single POINT ignition

Run the simulation:

- What fire behaviour should we expect?

- Where will the fire spread?

- What are the fire alignments?
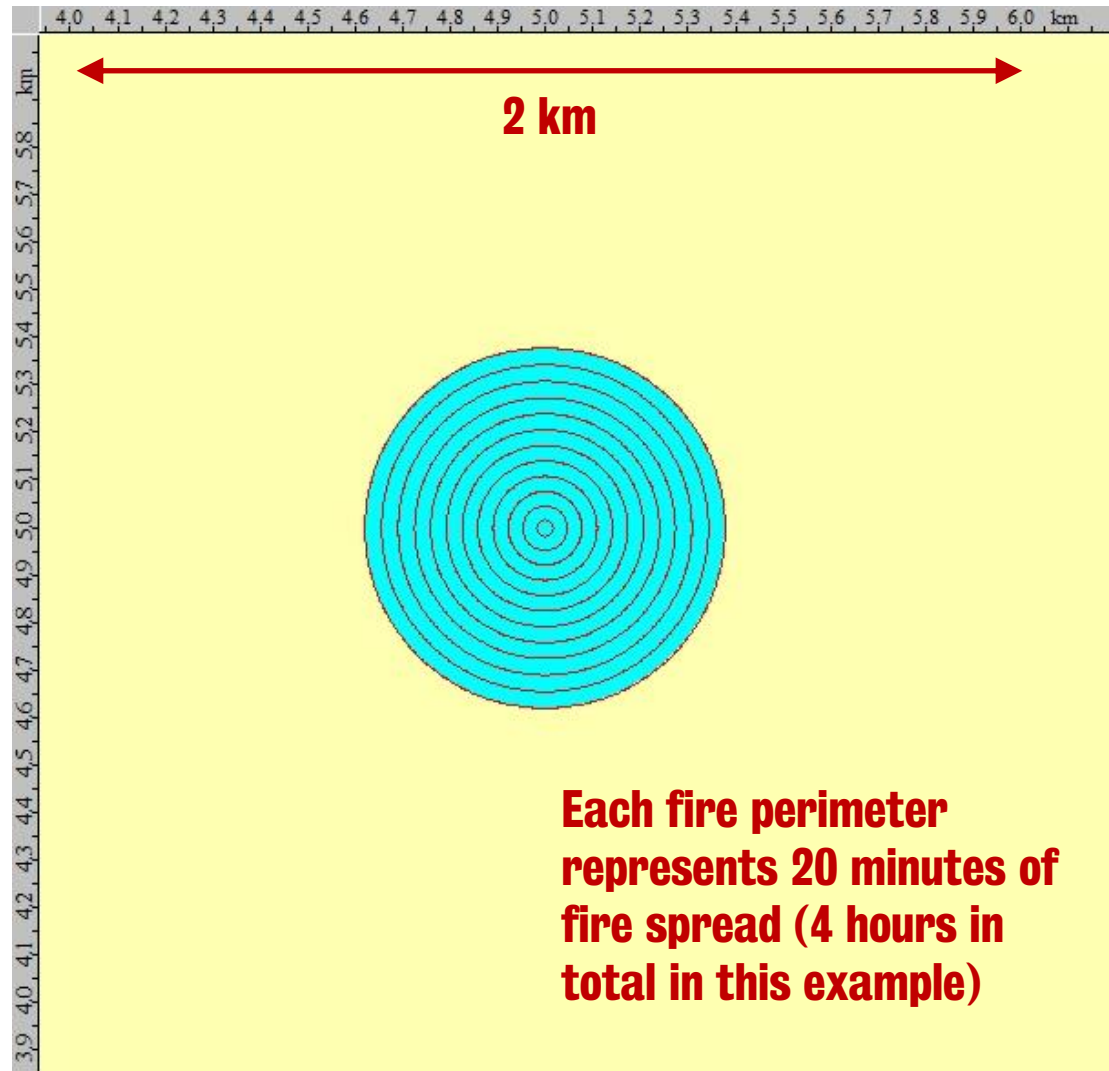
2 km

Ignition

SIMPLE MODEL 1: NO WIND OR SLOPE

- No wind   [0 m/s]

- No slope   [0°]

- 30% relative humidity

- Uniform fuel (dry grass)

- Single POINT ignition

Fire behaviour:

- Uniform spread in all directions (400 m in 4 hours)

- Low intensity (no alignment)

2 km

Each fire perimeter represents 20 minutes of fire spread (4 hours in total in this example)
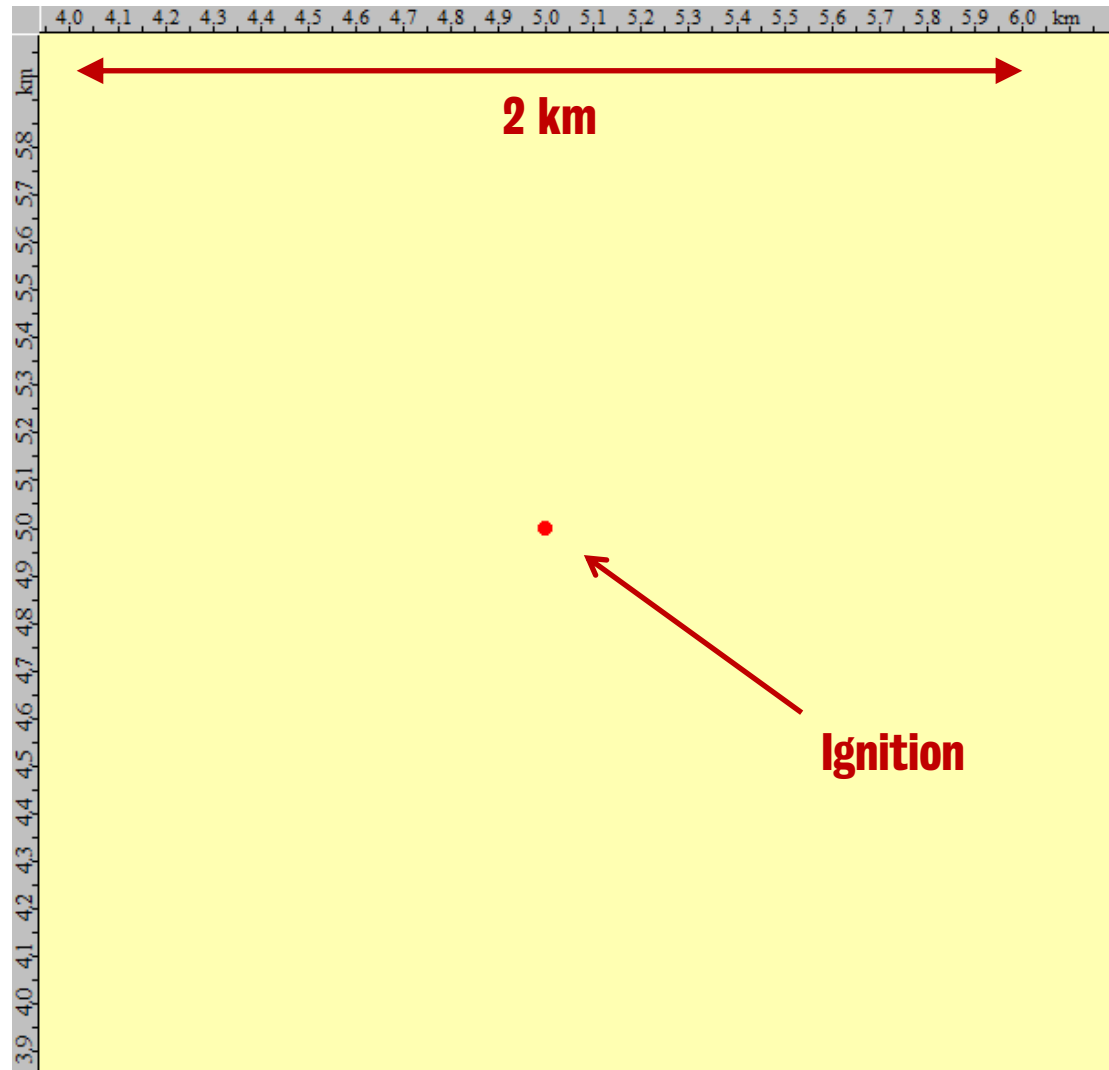
SIMPLE MODEL 2: WIND

Open Simulation
2 – WindNoSlope.fgm

- 10 km/hr wind [2.8 m/s]

- Southerly wind [180°]

- No slope [0°]

- 30% relative humidity

- Uniform fuel (dry grass)

- Single POINT ignition

Run the simulation:

- What fire behaviour should we expect?

- Where will the fire spread?
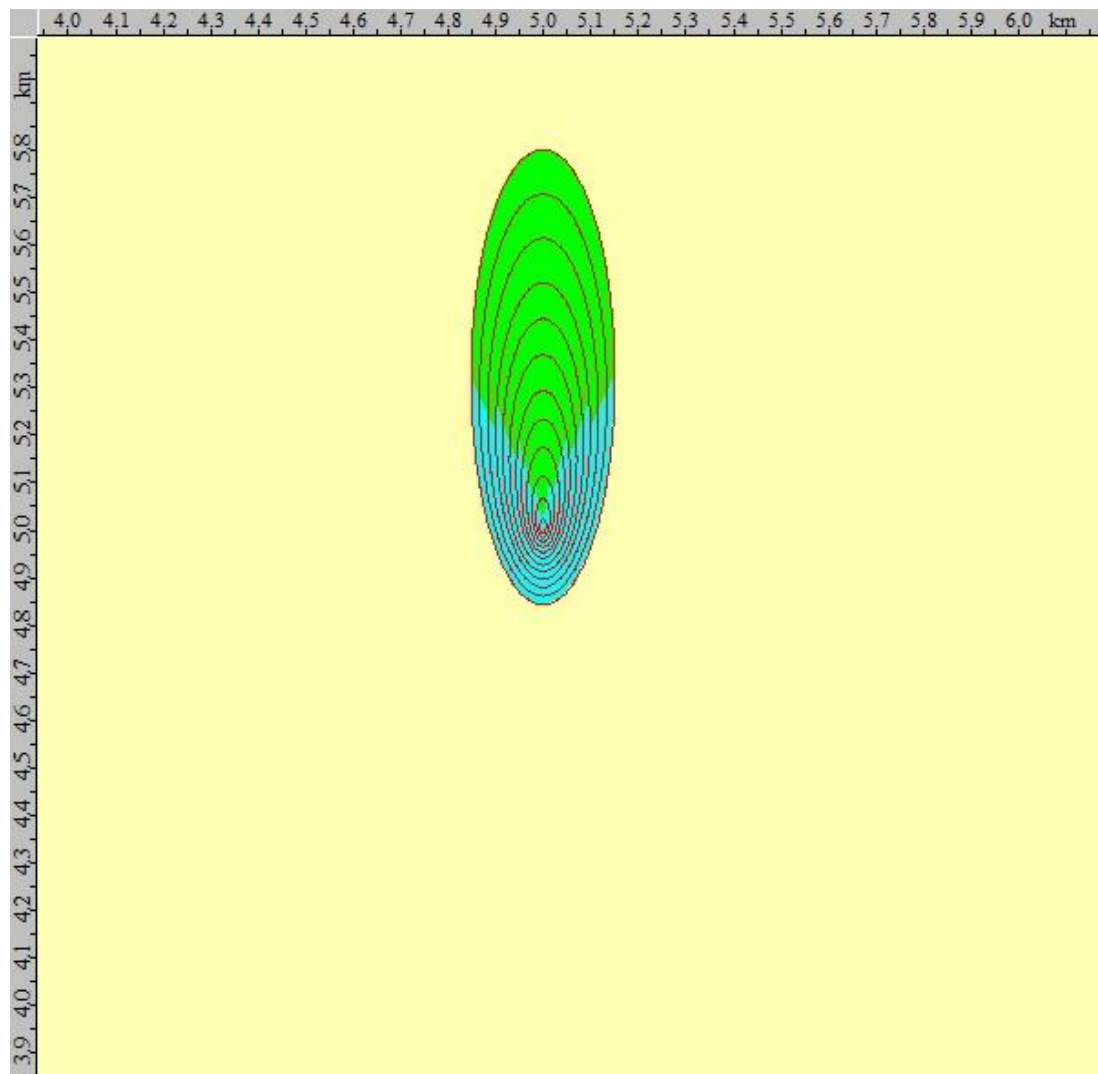
- What are the fire alignments?

2 km

Ignition

SIMPLE MODEL 2: WIND

- 10 km/hr wind [2.8 m/s]

- Southerly wind [180˚]

- No slope [0˚]

- 30% relative humidity

- Uniform fuel (dry grass)

- Single POINT ignition

Fire behaviour:

- Spreading faster to the north (800 m in 4 hours)

- Low intensity in backing and flank fires (no alignment)
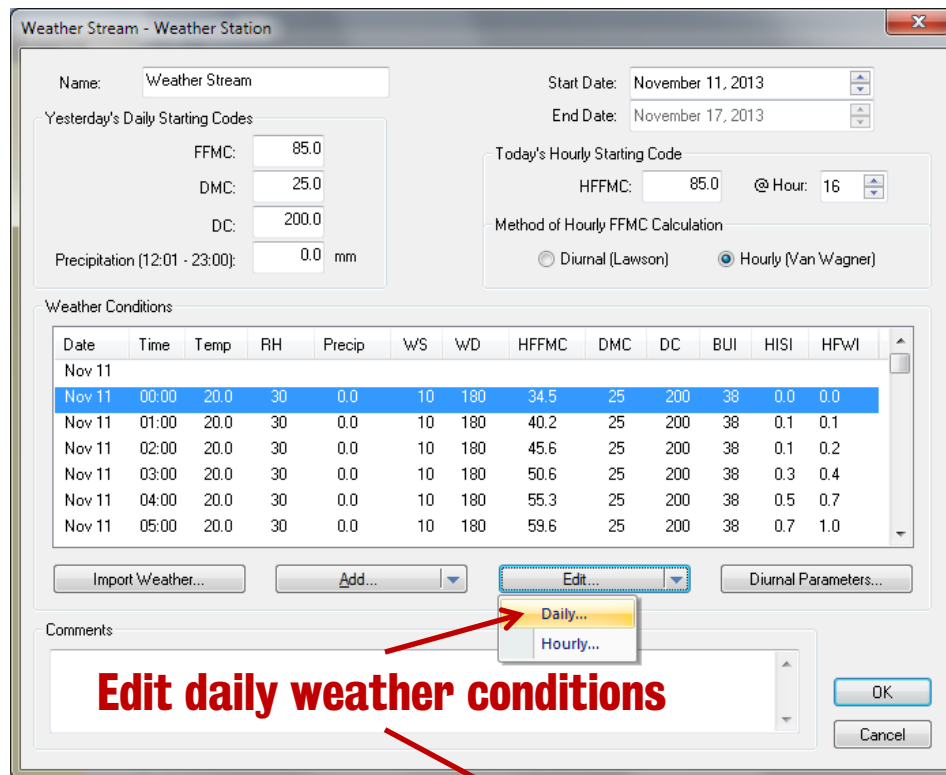
- Medium intensity in the head fire (alignments = 1)

SIMPLE MODEL 2: WIND

Change the weather stream so that the wind speed is now 20 km/hr.

- 20 km/hr wind [5.6 m/s]

- Southerly wind [180°]

- No slope [0°]

- 30% relative humidity

- Uniform fuel (dry grass)

- Single POINT ignition

Run the simulation:

- What fire behaviour should we expect?

- Where will the fire spread?

- What are the fire alignments?

Edit daily weather conditions

SIMPLE MODEL 2: WIND

- 20 km/hr wind [5.6 m/s]

- Southerly wind [180°]

- No slope [0°]

- 30% relative humidity

- Uniform fuel (dry grass)

- Single POINT ignition

Fire behaviour:

- Spreading even faster to the north (1.8 km in 4 hours)

- Low intensity in backing and flank fires (no alignment)

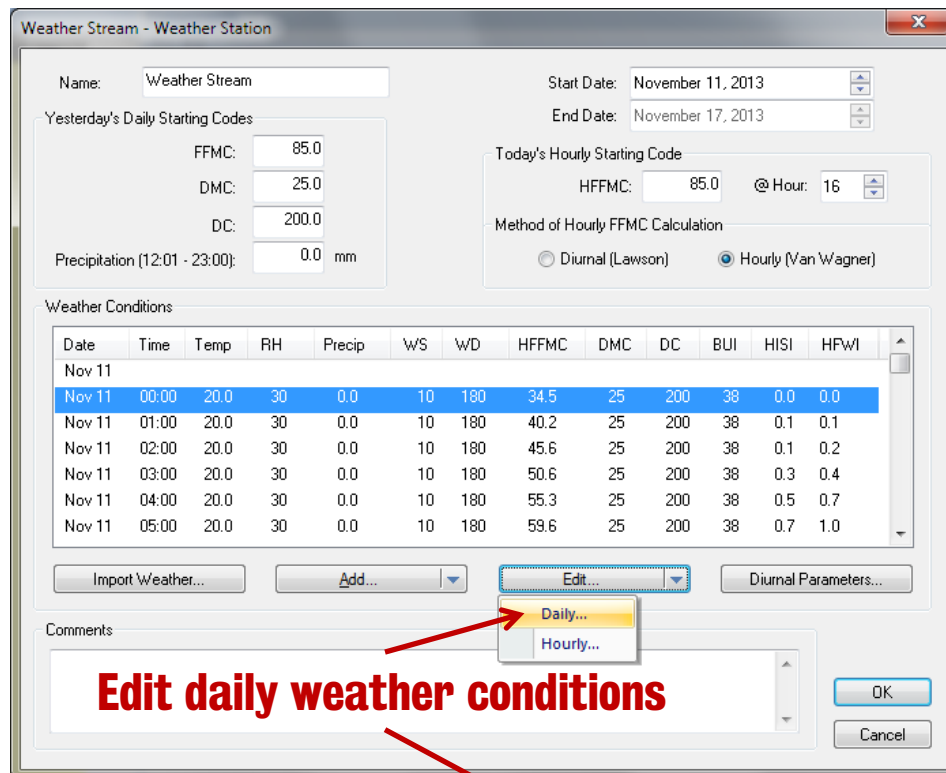- Medium-to-high intensity in the head fire (alignments = 1)
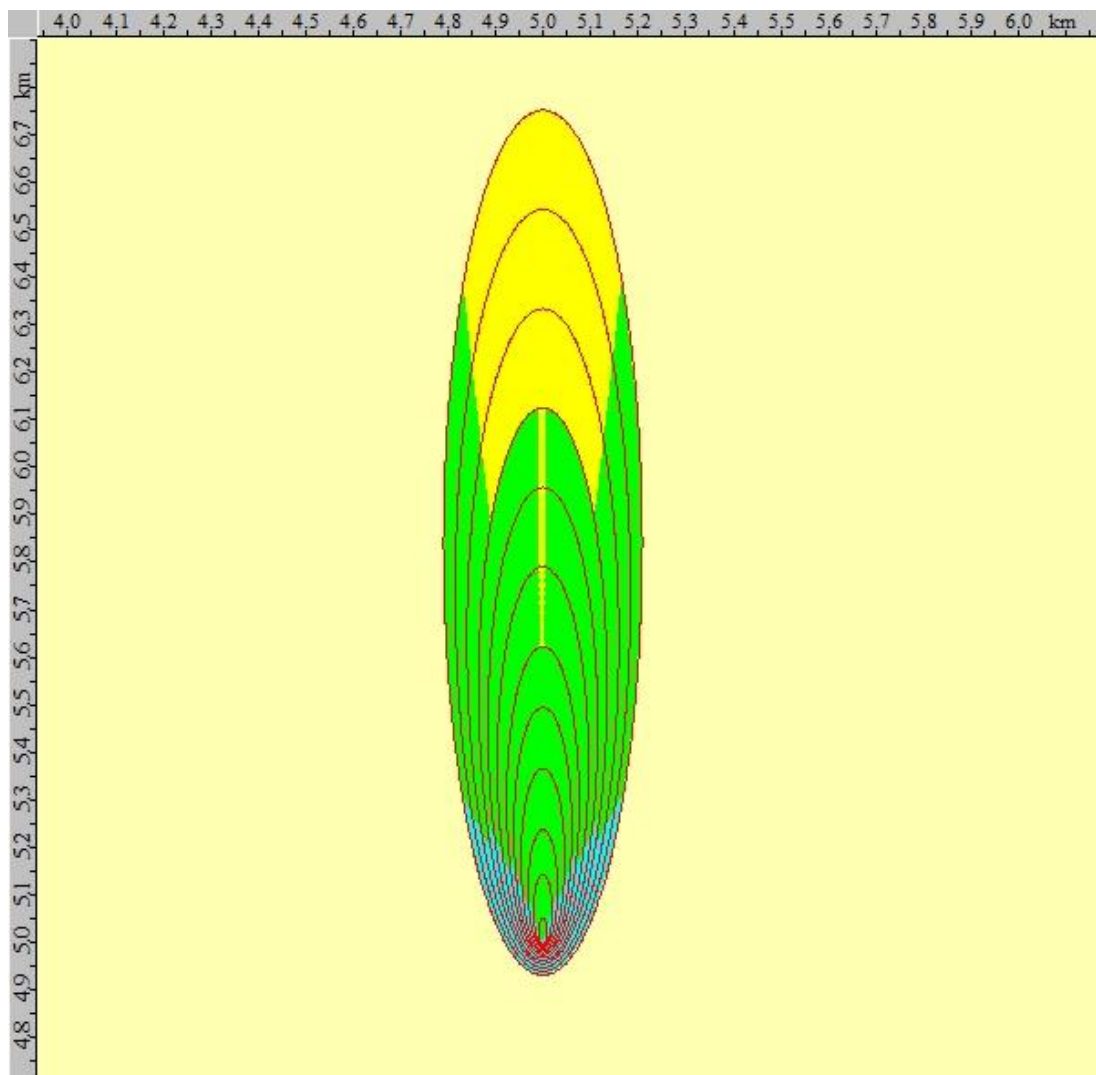
SIMPLE MODEL 2: WIND

Change the weather stream so that the wind speed is now 30 km/hr from the southeast (135˚).

- 30 km/hr wind [8.3 m/s]

- Southeasterly wind [135˚]

- No slope [0˚]

- 30% relative humidity

- Uniform fuel (dry grass)

- Single POINT ignition

Run the simulation:

- What fire behaviour should we expect?

- Where will the fire spread?

- What are the fire alignments?

Edit daily weather conditions

SIMPLE MODEL 2: WIND

- 30 km/hr wind [8.3 m/s]

- Southeasterly wind [135°]

- No slope [0°]

- 30% relative humidity

- Uniform fuel (dry grass)

- Single POINT ignition

Fire behaviour:

- Spreading even faster to the northwest (>3 km in 4 hours)

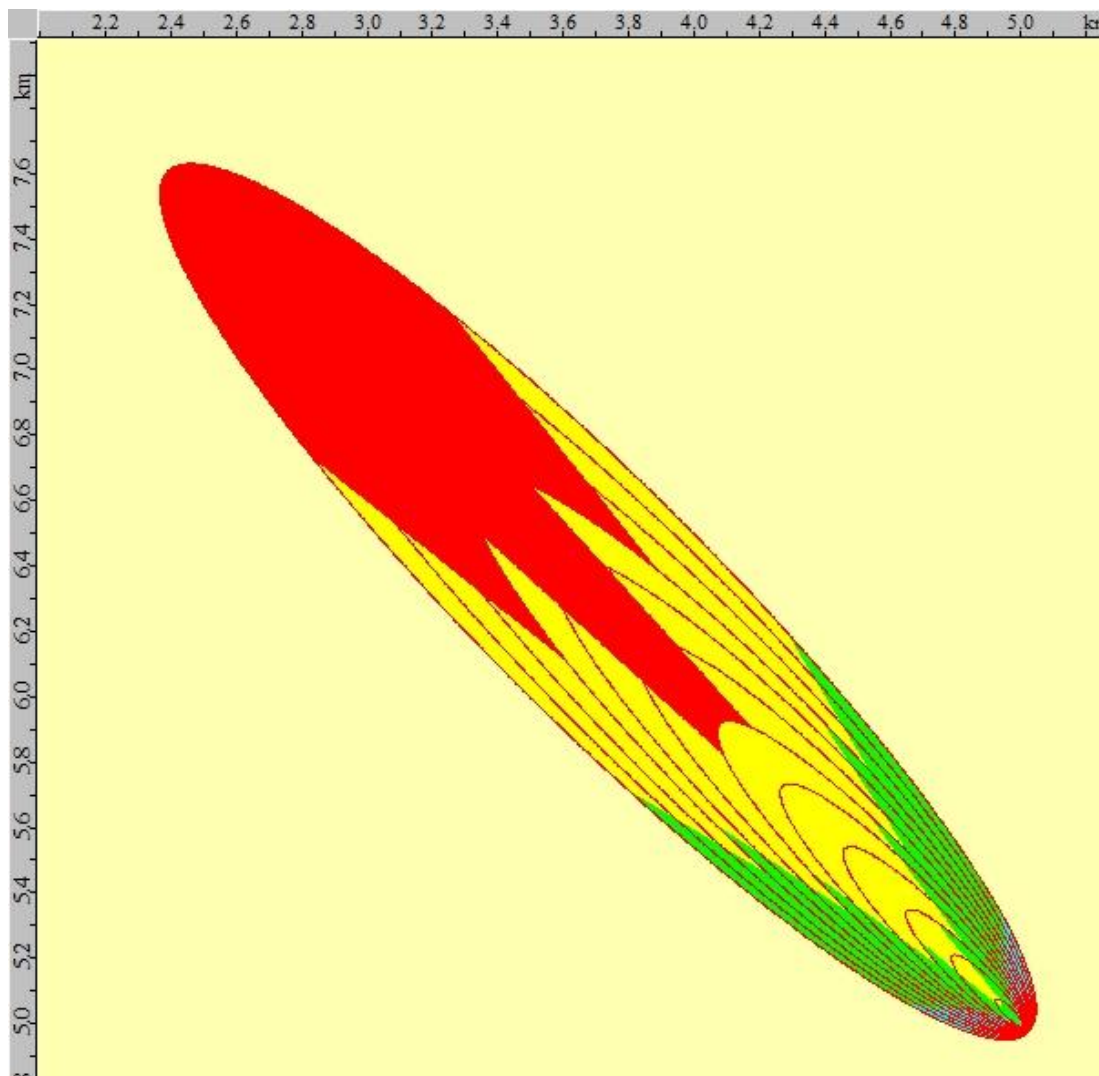- Low-to-medium intensity in backing and flank fires (no alignment)

- High-to-very high intensity in the head fire (alignments = 1, high wind)

LANDSCAPE MODEL 1: SLOPE

Open Simulation
3 – SlopeNoWind.fgm

- No wind   [0 m/s]

- Flat terrain moving into hilly terrain

- 30% relative humidity

- Uniform fuel (dry heather)

- Single POINT ignition

Run the simulation:

- What fire behaviour should we expect?

- Where will the fire spread?

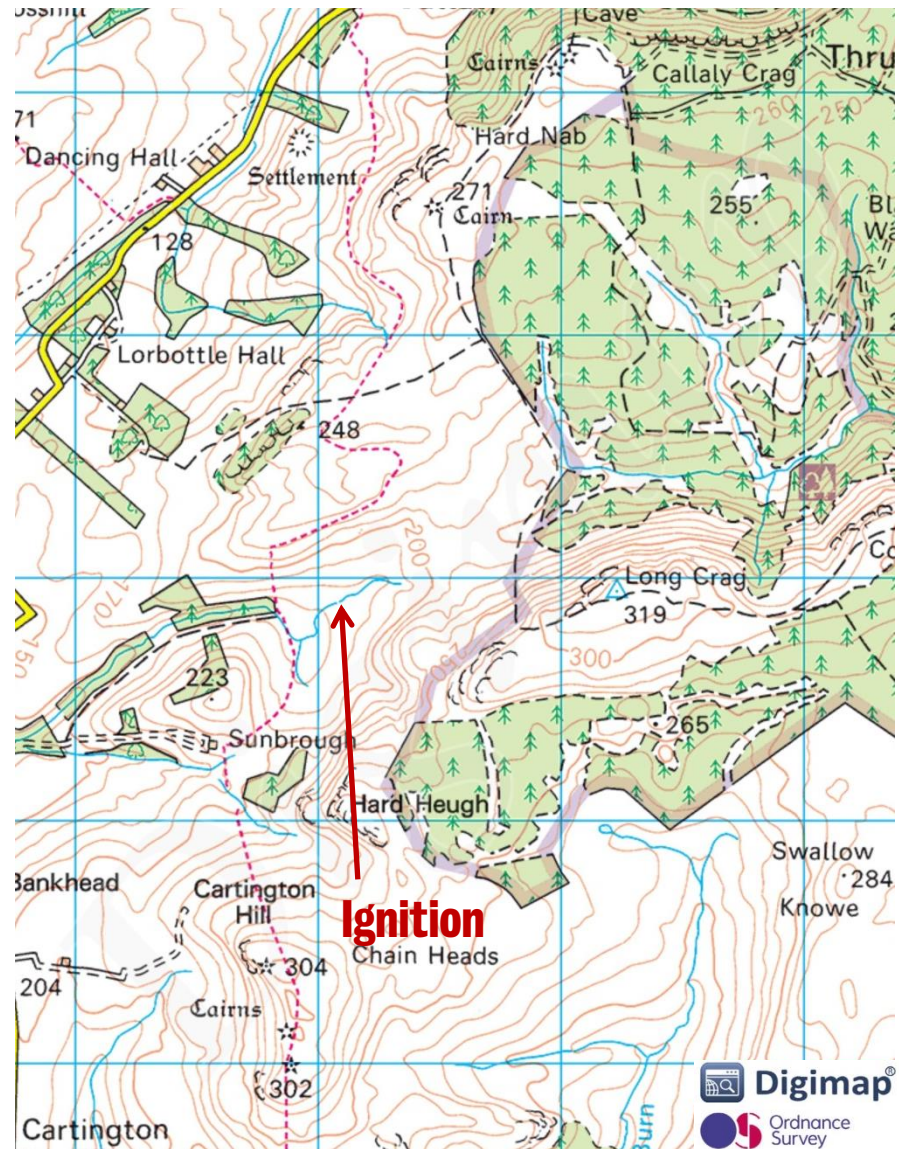- What are the fire alignments?

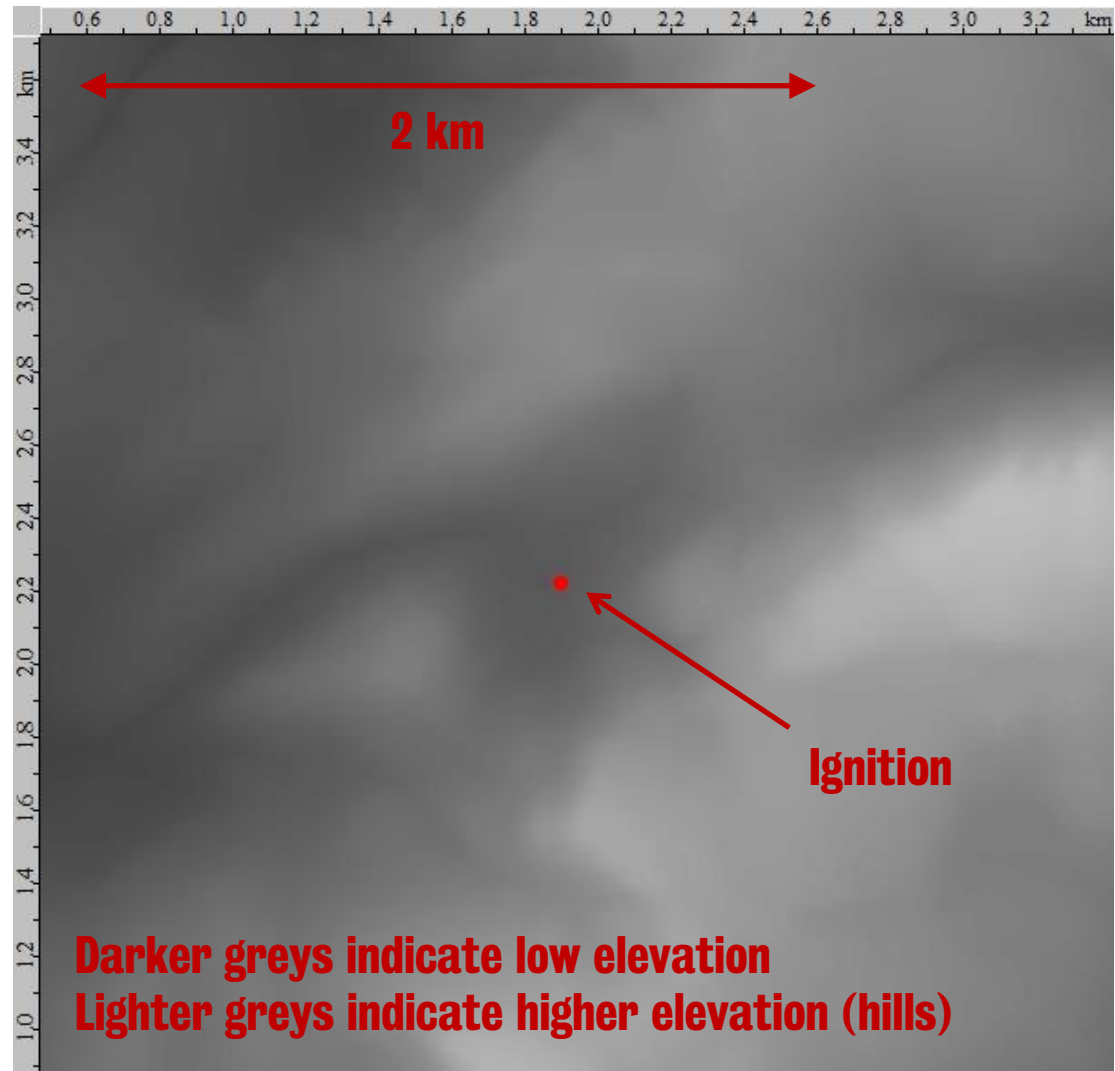Ignition

LANDSCAPE MODEL 1: SLOPE

Open Simulation
3 – SlopeNoWind.fgm

- No wind   [0 m/s]

- Flat terrain moving into hilly terrain

- 30% relative humidity

- Uniform fuel (dry heather)

- Single POINT ignition

Run the simulation:

- What fire behaviour should we expect?

- Where will the fire spread?

- What are the fire alignments?

2 km

Ignition

Darker greys indicate low elevation
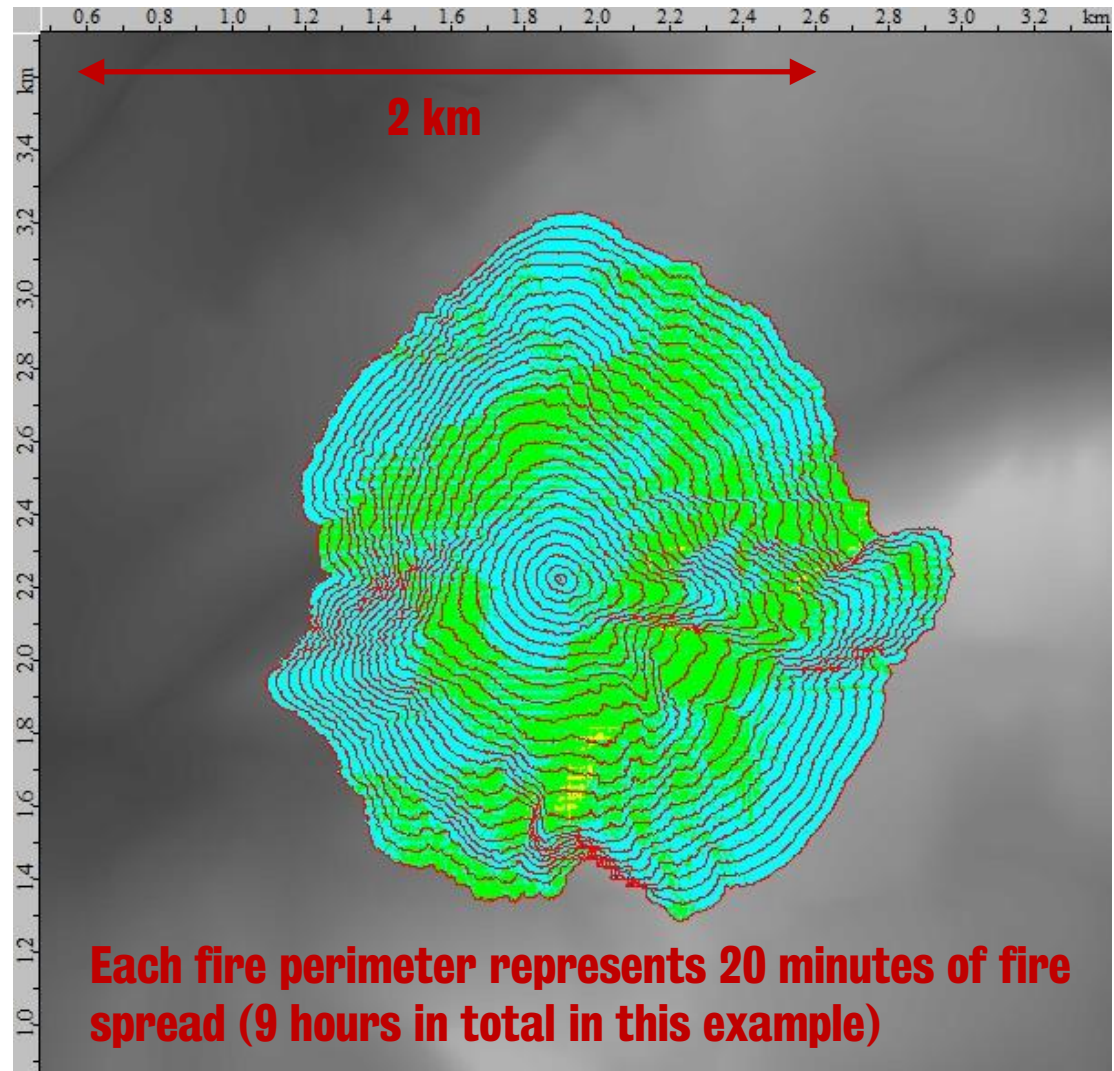**Lighter greys indicate higher elevation (hills)**

LANDSCAPE MODEL 1: SLOPE

- No wind   [0 m/s]

- Flat terrain moving into hilly terrain

- 30% relative humidity

- Uniform fuel (dry heather)

- Single POINT ignition

Fire behaviour:

- Initially a uniform spread with low intensity in all directions (no alignment)

- When fire moves upslope it accelerates and becomes more intense (alignment = 1 or 2)

- Fire decelerates on downslopes

2 km

Each fire perimeter represents 20 minutes of fire spread (9 hours in total in this example)
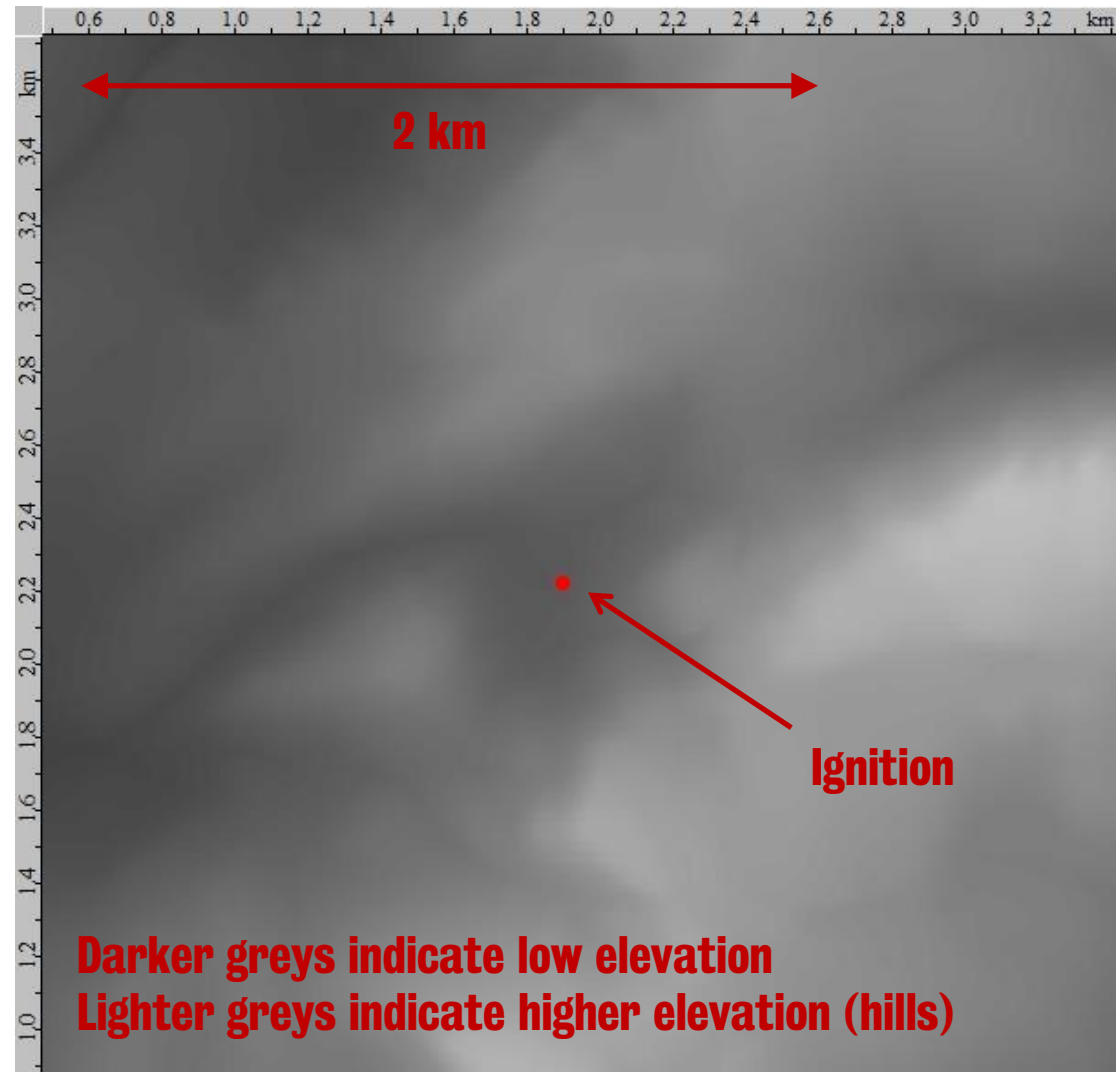
FIREfficient

Open Simulation
4 – **SlopeAndWind.fgm**

- 10 km/hr wind [2.8 m/s]

- Westerly wind [270°]

- Flat terrain moving into hilly terrain

- 30% relative humidity

- Uniform fuel (dry heather)

- Single POINT ignition

Run the simulation:

- What fire behaviour should we expect?

- Where will the fire spread?

- What are the fire alignments?

2 km

Ignition

Darker greys indicate low elevation
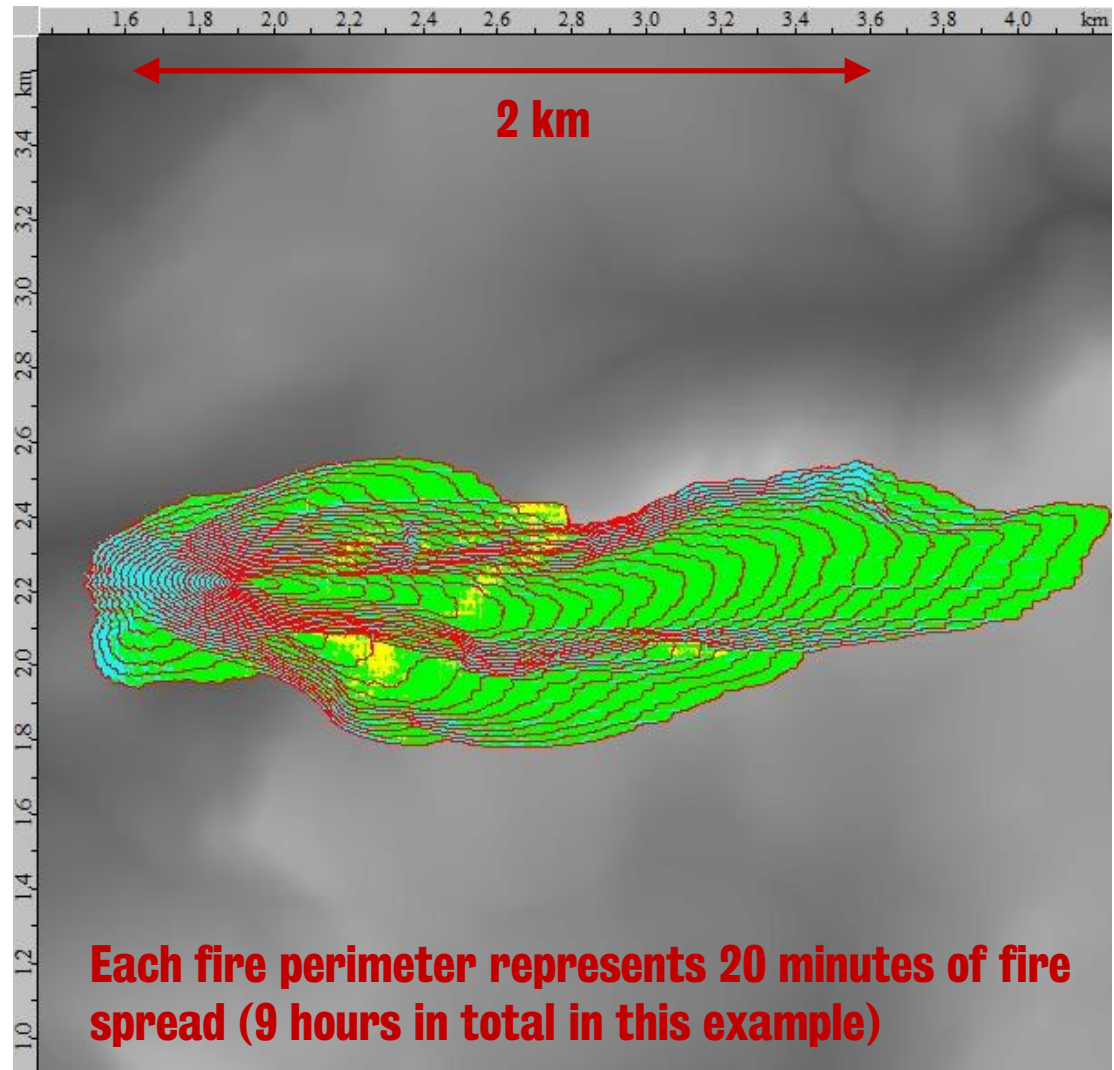Lighter greys indicate higher elevation (hills)

LANDSCAPE MODEL 2: SLOPE & WIND

- 10 km/hr wind [2.8 m/s]

- Westerly wind [270°]

- Flat terrain moving into hilly terrain

- 30% relative humidity

- Uniform fuel (dry heather)

- Single POINT ignition

Fire behaviour:

- Fire moves with the slope and wind eastwards

- Head fire burns with medium intensity, but this increases to high intensity on the steepest slopes (yellow patches).

- Fire burns with low intensity against the wind and slope (no alignment)

2 km

Each fire perimeter represents 20 minutes of fire spread (9 hours in total in this example)
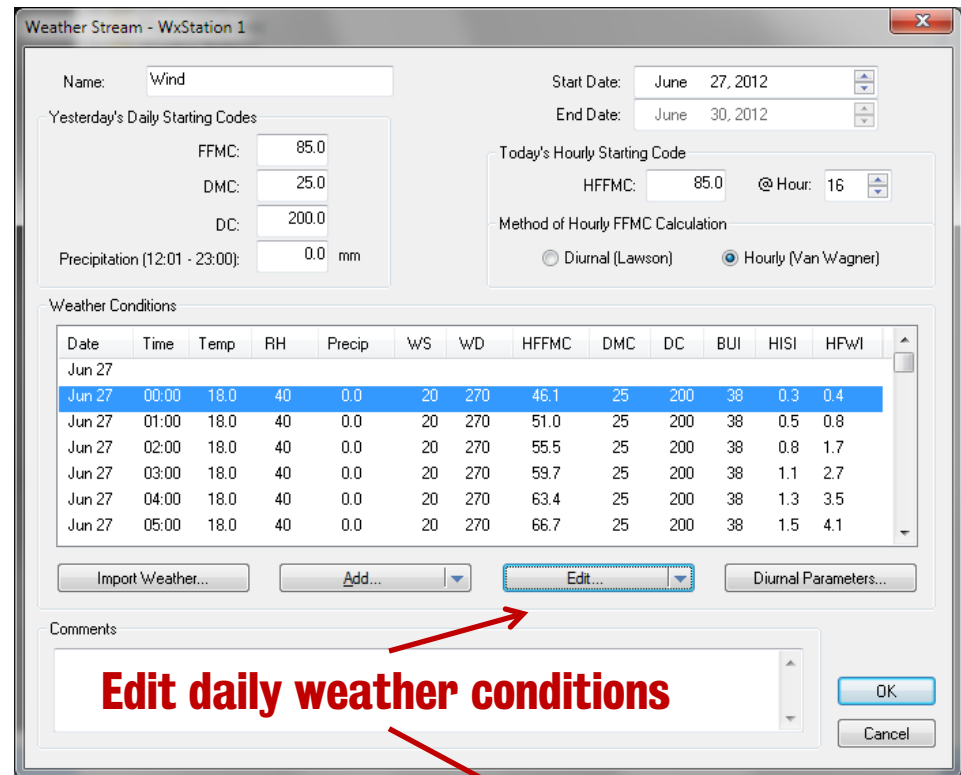
LANDSCAPE MODEL 2: SLOPE & WIND

Change the weather stream so that the wind direction is now from the northwest (315°).

- 20 km/hr wind [5.6 m/s]
- Northwesterly wind [315°]
- Flat terrain moving into hilly terrain
- 30% relative humidity
- Uniform fuel (dry heather)
- Single POINT ignition

Run the simulation:

- What fire behaviour should we expect?
- Where will the fire spread?
- What are the fire alignments?

Edit daily weather conditions

LANDSCAPE MODEL 2: SLOPE & WIND

- 20 km/hr wind [5.6 m/s]

- Northwesterly wind [315°]

- Flat terrain moving into hilly terrain

- 30% relative humidity

- Uniform fuel (dry heather)

- Single POINT ignition

Fire behaviour:

- Fire moves with the slope and wind southeastwards

- Head fire burns with medium intensity, but this increases to high intensity on the steepest slopes (yellow patches).

- Head fire decreases intensity when going down slope, even with the wind (alignment = 1 or 2, rather than 2 or 3)
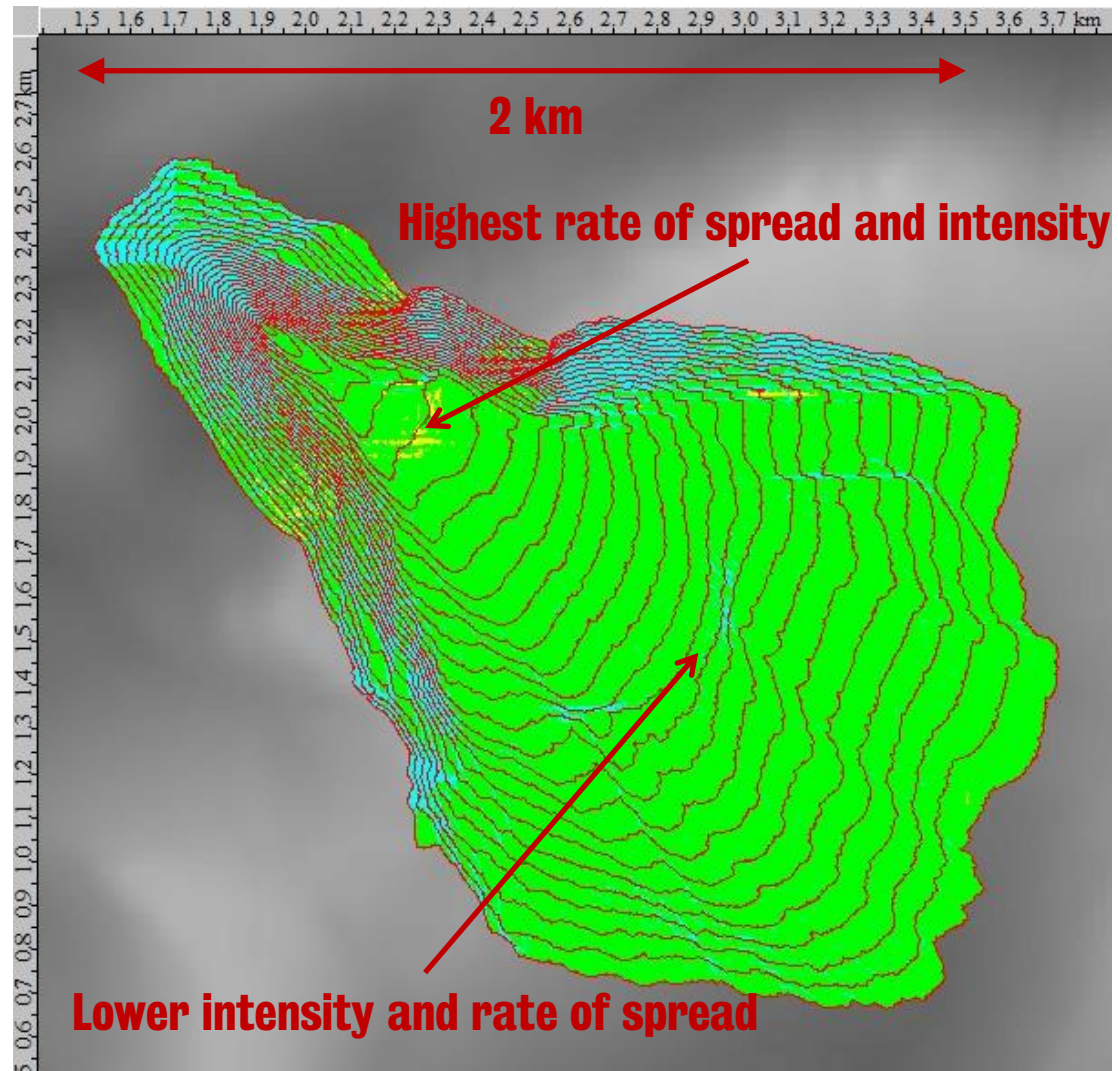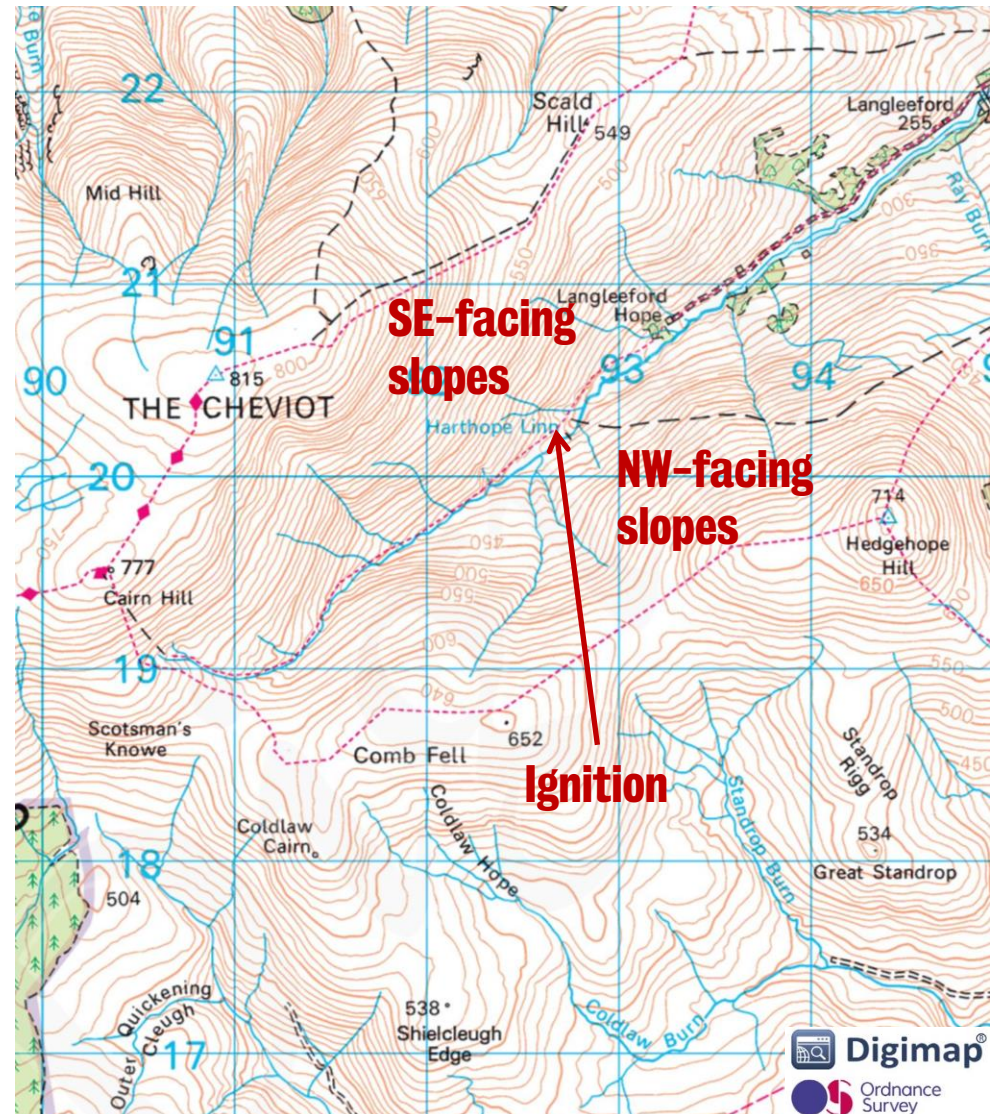

2 km

Highest rate of spread and intensity

Lower intensity and rate of spread

LANDSCAPE MODEL 3: ASPECT

Open Simulation
5 – AspectSlope.fgm

- No wind [0 m/s]

- Valley bottom with SE and NW facing slopes either side

- 30% relative humidity

- Uniform fuel (dry heather)

- Single POINT ignition

Run the simulation:

- What fire behaviour should we expect?

- Where will the fire spread?

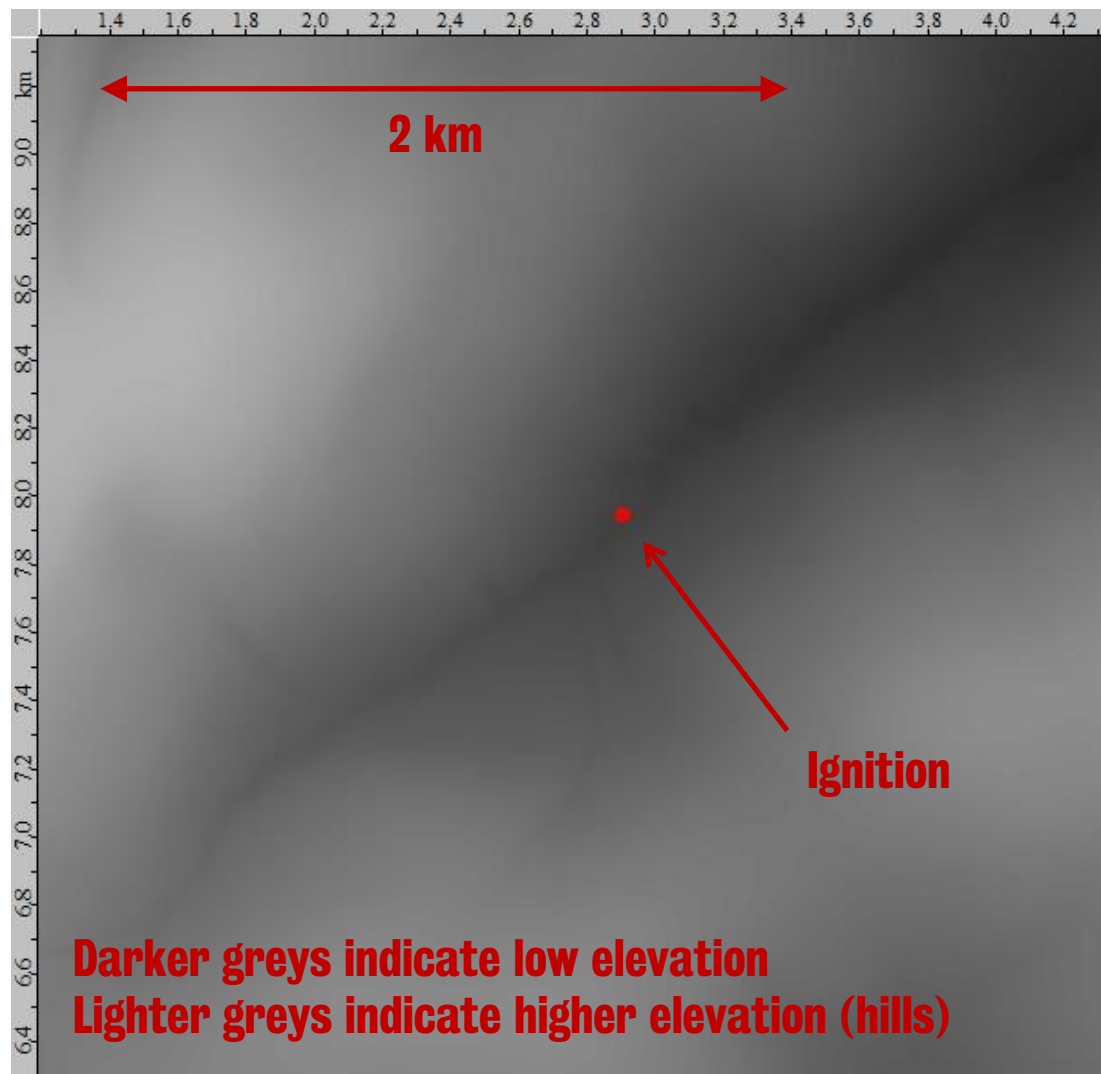- What are the fire alignments?

LANDSCAPE MODEL 3: ASPECT

Open Simulation
5 – AspectSlope.fgm

- No wind   [0 m/s]

- Valley bottom with SE and NW facing slopes either side

- 30% relative humidity

- Uniform fuel (dry heather)

- Single POINT ignition

Run the simulation:

- What fire behaviour should we expect?

- Where will the fire spread?

- What are the fire alignments?

2 km

Ignition

Darker greys indicate low elevation
Lighter greys indicate higher elevation (hills)

LANDSCAPE MODEL 3: ASPECT

- No wind   [0 m/s]

- Valley bottom with SE and NW facing slopes either side

- 30% relative humidity

- Uniform fuel (dry heather)

- Single POINT ignition

Fire behaviour:

- Fire moves with the slope

- Two head fires moving up both slopes. Head fire along SE-facing slope moves quicker and with more intenisty due to aspect and greater slope (alignment = 2). Head fire along NW-facing slopes moves slower (alignment = 1).

- Lower intensity fire moves up and down the valley.

2 km

Highest rate of spread and intensity

Lower intensity and rate of spread
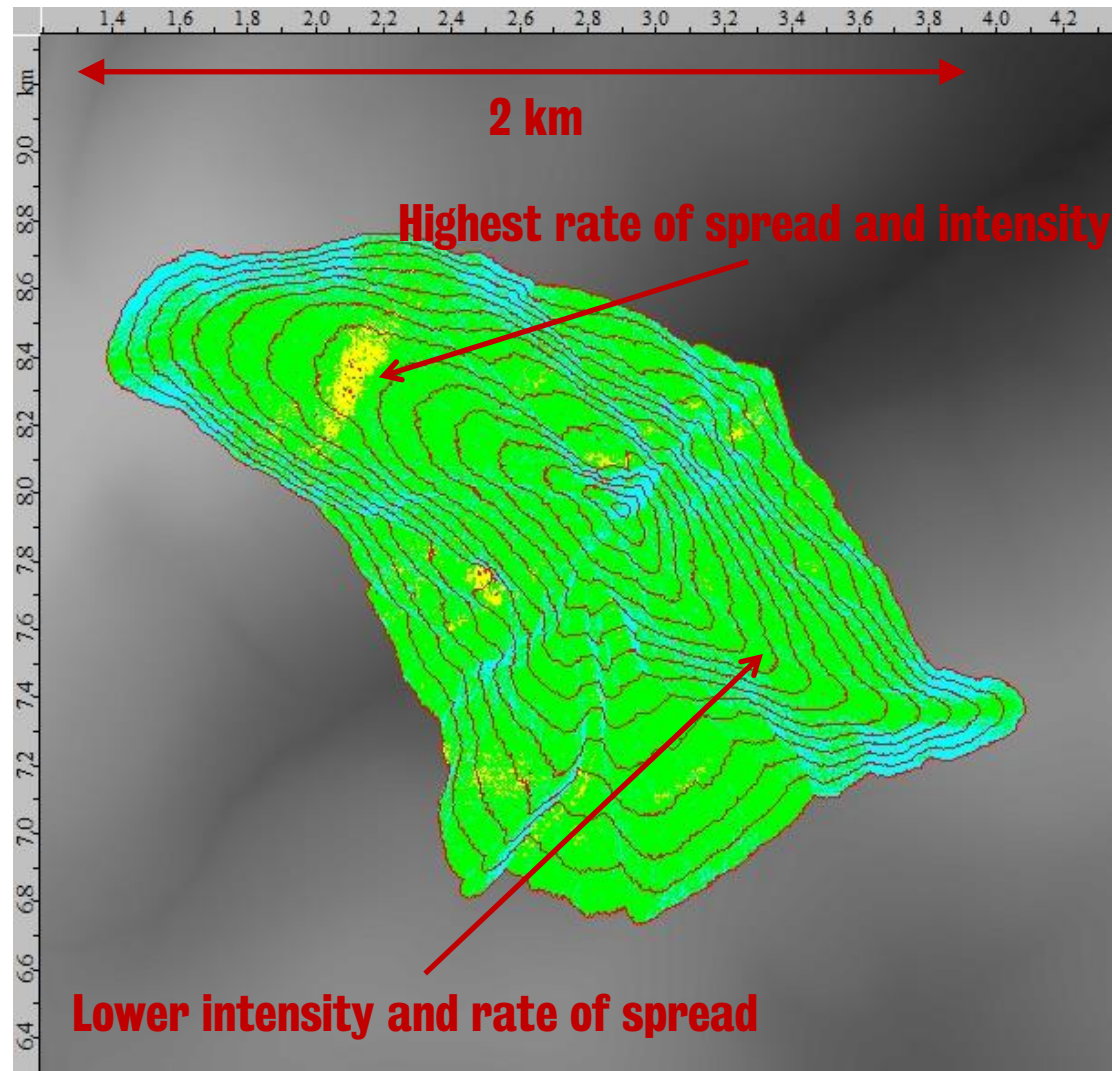
Open Simulation
6 – WindShift.fgm

- 20 km/hr wind [5.6 m/s]

- Southerly wind [180°] changing to Westerly wind [270°]

- No slope   [0°]

- 30% relative humidity

- Uniform fuel (dry grass)
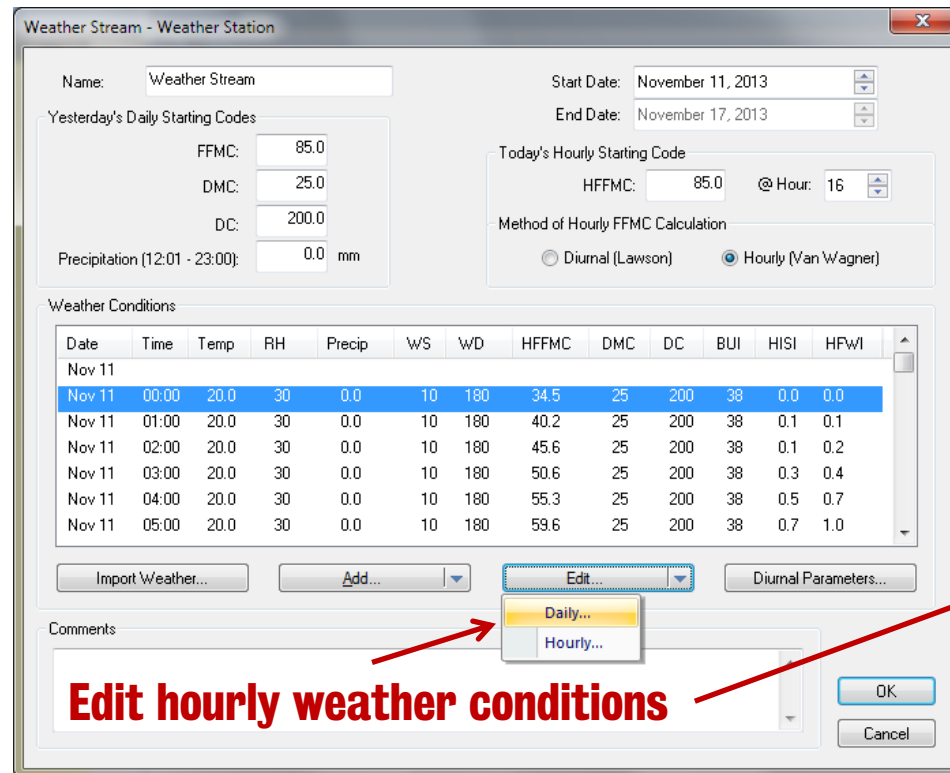
- Single POINT ignition

Run the simulation:

- What fire behaviour should we expect?

- Where will the fire spread?

- What are the fire alignments?

2 km
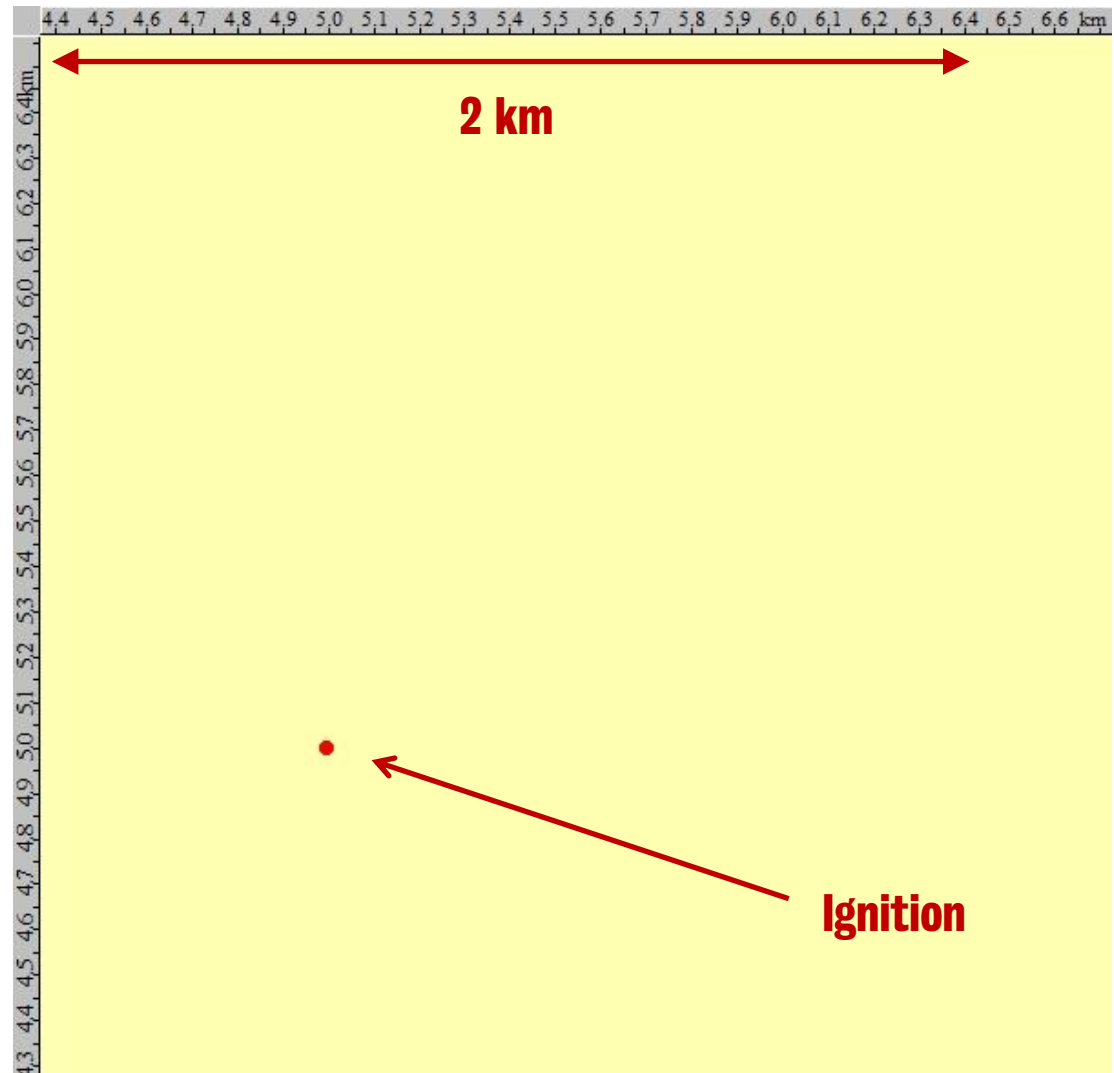
Ignition

SIMPLE MODEL 3: WIND SHIFT

- 20 km/hr wind [5.6 m/s]

- Southerly wind [180°] changing to Westerly wind [270°]

- No slope [0°]

- 30% relative humidity

- Uniform fuel (dry grass)

- Single POINT ignition

Fire behaviour:

- Spreading to the north (600 m in 2 hours)

- Low intensity in backing and flank fires (no alignment)

- When wind changes direction, the slow-moving low-intensity east flank fire becomes a large quick-moving (1 km in 2 hours) high-intensity head fire.

2 km
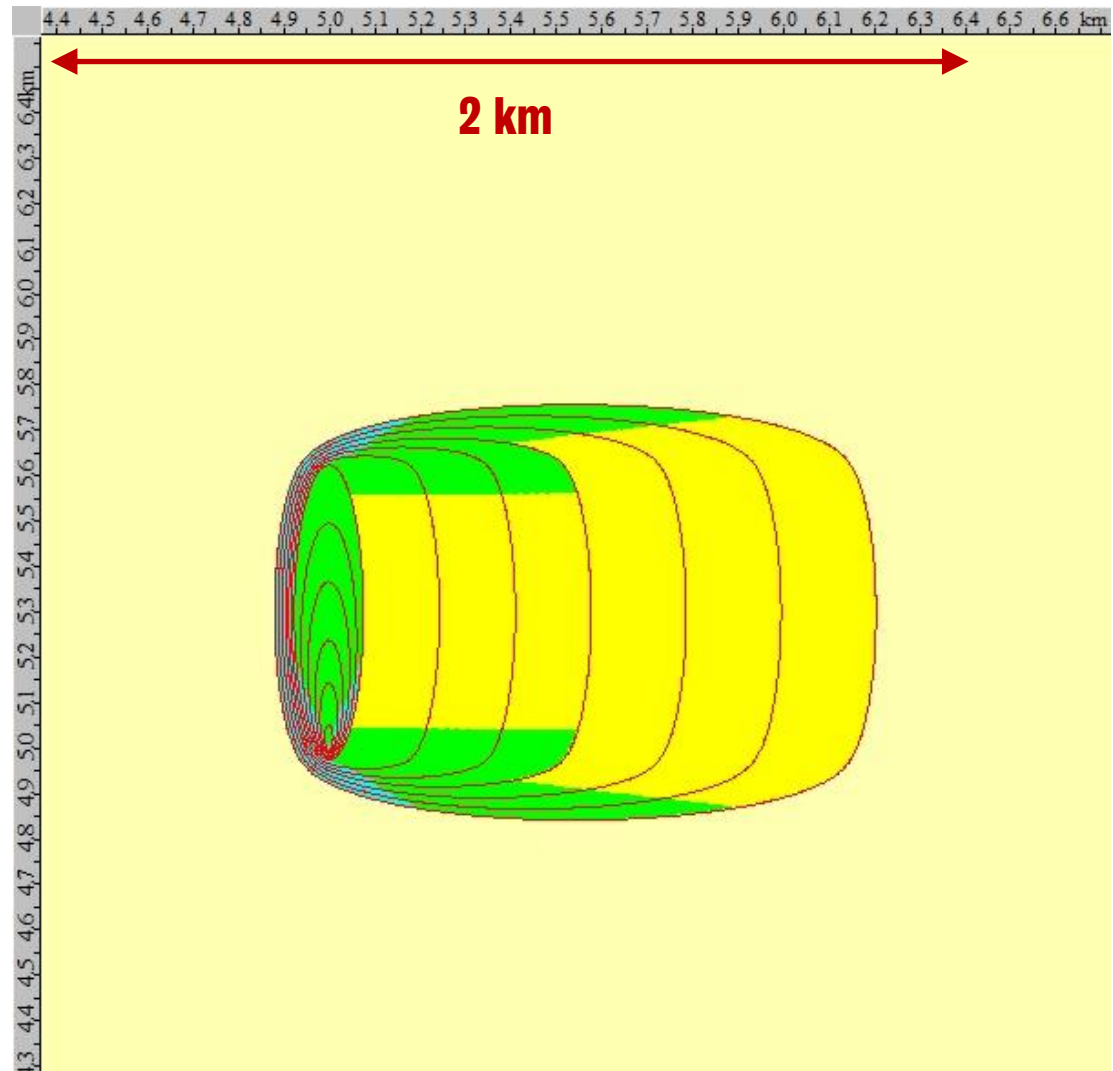
SIMPLE MODEL 3: WIND SHIFT

Change the wind speed and wind direction in the weather stream by clicking on "edit" and then "hourly". Here you can adjust the time of the wind shift and the direction that it shifts to, as well as the wind speed. Try doing the same for some of the landscape models used previously.

Edit hourly weather conditions

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