



There is a large basin (yellow boundary) and one of its subbasin (purple boundary). TWI\_min\_sub and TWI\_max\_sub are the minimum and the maximum values of TWI in the subbasin, while TWI\_min\_large and TWI\_max\_large are the minimum and the maximum values of TWI in the large basin, respectively.

The TWI of the target cell is represented as T0, so when modelling the flow dynamics for the large basin, the normalized TWI for the target cell is equal to:

$$(T0 - TWI_{min\_large}) / (TWI_{max\_large} - TWI_{min\_large})$$

When modelling the flow dynamics for the subbasin, the normalized TWI for the target cell is equal to:

$$(T0 - TWI_{min\_sub}) / (TWI_{max\_sub} - TWI_{min\_sub})$$

Hence, when basins with different scales are used, a cell may be assigned with different normalized TWI value, and this situation can also happened to the normalized slope length factor and flow path curvature.