

Calculation of the Topographic Index

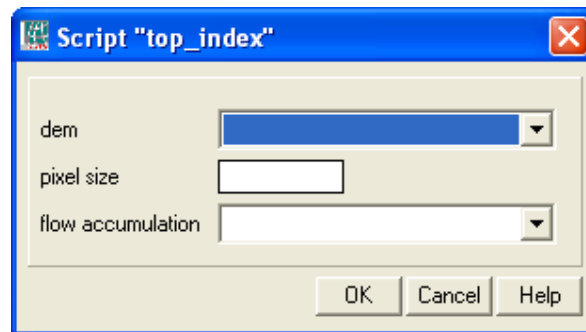
Digital elevation model, having metric coordinate system (e.g. UTM)

Pixel size (in meters)

Flow Accumulation Map, can be produced using the ILWIS DemHydro Processing module, select first the options Fill, Flow Direction and subsequently Flow Accumulation.

Copy the script files in the ILWIS \Scripts sub-directory. Start ILWIS and from the menu select "Operations" > "Scripts" and select the script "top_index".

Figure 1: input parameters required to run the top_index script



Script Listing and short description:

```
//first derivative in X direction
```

```
dfdy_1.mpr{dom=value;vr=-1000:1000:0.1}:= MapFilter(%1,DFDY.fil,value)
```

```
calc dfdy_1.mpr
```

```
//first derivative in Y direction
```

```
dfdx_1.mpr{dom=value;vr=-1000:1000.7:0.1}:= MapFilter(%1,DFDX.fil,value)
```

```
calc dfdx_1.mpr
```

```
// calculate slope map in percentage
```

```
slp_perc:=100*(hyp(dfdx_1,dfdy_1)/PIXSIZE(%1))
```

```
calc slp_perc.mpr
```

```
// calculate slope map in degrees
```

```
slp_deg:=RADDEG(ATAN(slp_perc/100))
```

```
calc slp_deg.mpr
```

```
//Eventually change 0 degree slopes to 0.0001 degree
```

```
//Calculate the flow accumulation area or upslope area (A)
```

```
flowacc_area{dom=value;vr=-1000:1000000000000000000000000:1}:=3*%2^2
```

```
calc flowacc_area.mpr
```

```
// ln(a/tan(slope in degree))
```

```
//a = (flowacc_area/gridsize or horizontal resolution of the DEM)
```

```
// Calculate the topographic index map
```

```
topographic_index{dom=value;vr=-  
1000:1000:0.001}=LN((flowacc_area/%2)/(TAN(DEGRAD(slp_deg))))
```

```
calc topographic_index.mpr
```