|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Input | Output | Dir /lib | Parameters | Functions | Notes |
| **Wind downscale** |  |  |  |  |  |  |
| Wind\_1\_readdata | Wind ncdf files for each decade | Wind\_v.r  Wind\_u.r | Dir\_wind  Ncdf4 |  |  | Creates r file from ncdf |
| Wind\_2a\_sheltermaps | Dem (to 10km) | Shelter\_XX\_deg.r  Matrix of values | In: none  Out dir\_shelter  Raster,rgdal | Wind dir interval= 5deg | Horizonangle  Windindex | Calc shelter coef map (100m) for every wind direction |
| *Wind\_2b\_rasterdscale* | *Wind\_v.r*  *Wind\_u.r*  *Shelter\_XX\_deg.r*  *Dem* | *strength\_yr\_month\_day\_h.r*  *direction\_yr\_month\_day\_h.r*  *matrixes (or rasters)* | *In: dir\_shelter, dir\_wind,*  *Out: dir\_wind/ strength & direction* | *Yr,month,day,*  *interval* | *Windstrength (wdir,wstr,int=5){calculates using rasters}*  *JD(dmy)*  *Arrayval(h,d,m,y)* | *Dsc wdata to 100m hrly*  *Calc wstr*  *Adjust to 1m height]*  *Calc wdir*  *Correct wstr*  *Uses raster fun and load only maps reqrd* |
| Wind\_2b\_downscale | Wind\_v.r  Wind\_u.r  Shelter\_XX\_deg.r  Dem | strength\_yr\_month\_day\_h.r  direction\_yr\_month\_day\_h.r  matrixes | In: dir\_shelter, dir\_wind,  Out: dir\_wind/ strength & direction | Yr,month,day,  interval | JD(dmy)  Arrayval(h,d,m,y) | Loads sheltermaps to matrix,  Dsc wdata to 100m hrly  Calc wstr  Adjust to 1m height]  Calc wdir  Correct wstr |
| **Coast effect** |  |  |  |  |  |  |
| Inlsratio\_jm\_2 | Dem, demuk (to 10km) | Map of ratio Lcell for 100m cells for each wind direction - invratio\_*dir*deg.tif | Out: dir\_lsratio |  | inv.dist, inv.ls(landsea,dir), | Calculate inverse land:sea ratio for different wind directions Works in 10km blocks |
| *Lref-Lcell\_maps(2)* |  |  |  |  | *landcells, near\_Lref, LalltoLref, percent\_land* | *Calculate Lref for all 5km cells = (i) mean aggregated 100m cells, or (ii) or mean of nearest 5km (from which T data will come)* |
| Ldif\_maps | % land maps at 100m (=Lref)  Lcell maps | Map of Lref(%land) – Lcell for each wind direction.  ldif\_from\_pland\_in\_XXkm.tif | In: dir\_percland, dir\_lsratio  Out: dir\_ldif |  | Wind direction (from) |  |
| Coast\_effect\_maps | Dem, gridmask | landin\_*radius*km\_complete\_100m.r  landin\_*radius*km\_complete\_5km.r  Lref as expressed by proportion of land within radius r | Dir in:  Dir out: dir\_percland/ | Radius (for % land) | landcells, percent\_land, nearestVal | Write maps of %land within radius r of centre of all cells. Cells without historic 5km data calculated from nearest cells (mean) – must match source of T data. Output as 5km and 100m rasters for each r. |
| *Coasteffect\_sectorfilter* | *Dem,demuk,* | *Coast\_Index\_d\_XX\_km\_XXdeg.r* | *In:*  *Out: dir\_coast* | *Radius (of effect)=2000, res=100* | *Vectorxy(angle,radius){end xy from 0,0}, areClockwise(2vectors), sectorfilter(m,rad,v1,v2* | Alternative index to L (inv land:sea ratio) – based on sector area.  *Create buffered and land/sea dem*  *Calc filter for dif wdir*  *Applies filter via focal fun* |
| *Calc\_coast\_effect* | *redundant* |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Sst\_1\_downscale |  |  |  |  |  | Downscale world sst data to 5km daily data |
| Sst-tref |  |  |  |  |  | 1. Create map of upwind cell refs for each wind direction |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

Dem:

e.dem<-extent(c(70000,420000,0,180000)) # includes scilly isles

e.dem<-extent(c(130000,400000,10000,180000)) # excludes scilly isles

**Maps/Data and resolution – analyse by UKCP 5x5km blocks and 35x35km buffer blocks**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **T varies** | **Spatial Res** | **Time Res** | **Other** | **Notes** |
| T historic | 5km UKH | daily |  |  |
| T historic t downscale | 5km UKH | hourly |  |  |
| **T historic sp & t downscale** | 100m | hourly |  | Calculated using vs functions |
|  |  |  |  |  |
| Wind direction downscale | 100m | hourly |  |  |
| Wind strength | 100m | hourly |  |  |
| Inverse wind |  |  |  | 1/sqrt(wind\_speed) |
|  |  |  |  |  |
| Radiation downscale | 100m | hourly |  |  |
|  |  |  |  |  |
| SST downscale | 5km/100m | daily |  |  |
| SST-Tref | 100m | hourly |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **T constant** |  |  |  |  |
| DEM | 100m | constant |  |  |
| WindShelter maps | 100m | constant | By wind dir |  |
| Lcell | 100m | constant | By wind dir |  |
| Lref | 100m/5km | constant | By wind dir | ILS for nearest 5km ref cell |
| Lref-Lcell |  |  |  | Uses above two |
| % land in radius | 100m | constant | By wind dir |  |
| %Landref - Lcell | 100m | constant | By wind dir |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Change to: 120000,42000,10000,180000

Block calculations:

Divide into 5x5km blocks

Assign extent to dem

Assign buffer extent dem+30km?

Load in relevant maps and crop for block