

GW Recharge assessment in the VTP Application of WetSpass Graphical User Interface, Version 2012

Somphasith Douangsavanh

26 Feb 2015

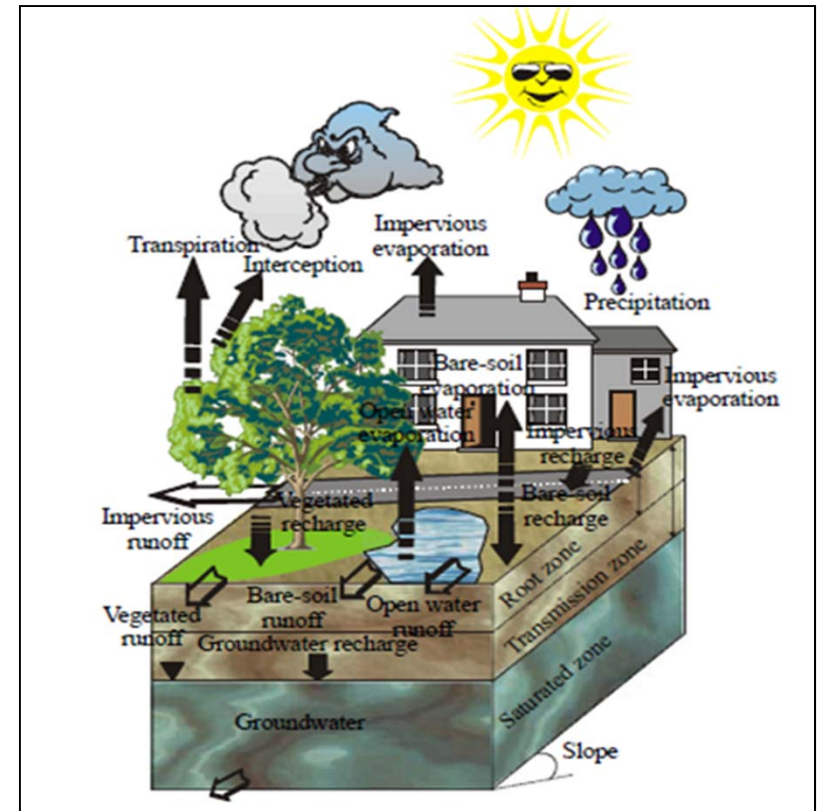
Informal presentation to Paul, Guillaume, Brindha & COCO

Model concept

WetSpass Graphical User Interface
version 2012, developed by VUB
(VRIJE UNIVERSITEIT BRUSSEL),
Belgium. K.Abdollahi, I. Bashir & O.
Batelaan.



Estimation of seasonal groundwater
recharge (wet & dry season)



Model concept: water balance
calculation per raster cell

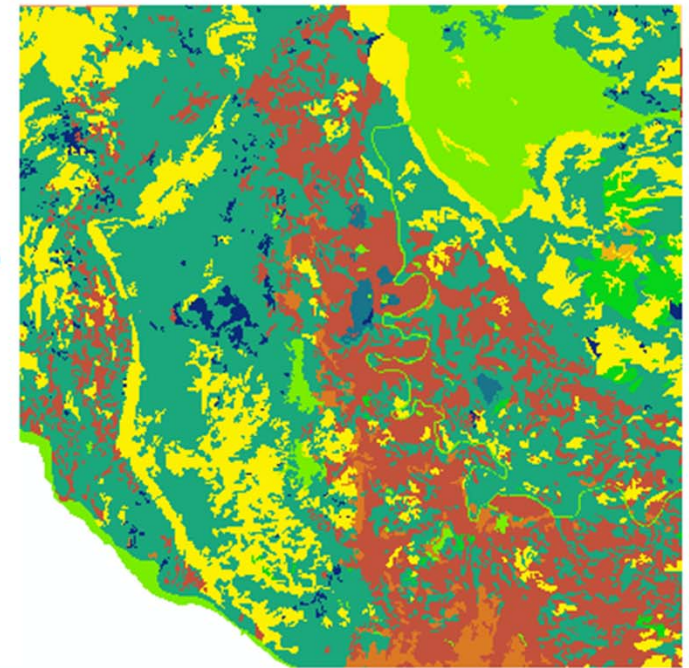
Required input data

Raster Grid files (ASCII)	Text file (.tbl)
- Soil - Topography - Slope - Land use - Temperature (dry and wet) - Precipitation (dry and wet) - PET (dry and wet) - Wind-speed (dry and wet) - Ground water depth (dry and wet)	- Soil parameter - Runoff coefficient - Land use parameter

Data development

Land cover

- NAFRI_LC 2002 in shape file was converted to raster grid 100x100m.
- 736 columns & 736 rows, about 73.6 by 73.6km
- Changed original LC code to the model code



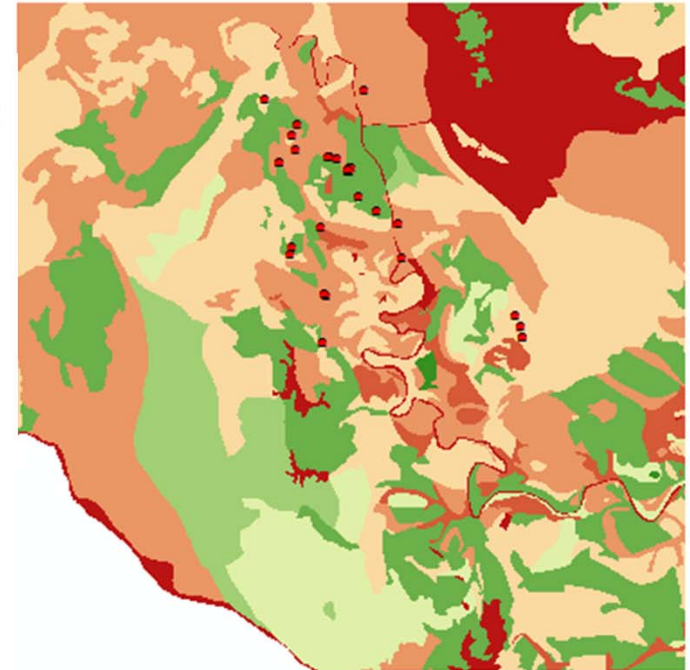
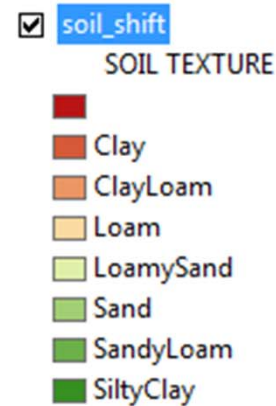
lc2002_rect1

Rowid	VALUE	COUNT	TYPE	NAME	MODEL_VALUE	BY_MODEL_NEW_NAM
0	11	3788	11	Upper Dry Evergreen	31	Decidious forest
1	13	84995	13	Upper Mixed decidious	31	Decidious forest
2	17	725	17	Coniferous Forest	32	Coniferous forest
3	18	2251	18	Mixed Broad-Leaved and Coniferous	33	Mixed forest
4	21	8216	21	Bamboo	33	Mixed forest
5	22	227745	22	Unstocked Forest	33	Mixed forest
6	24	6810	24	Ray	36	Shrub
7	31	59	31	Savannah	36	Shrub
8	32	342	32	Scrub	36	Shrub
9	41	103728	41	Rice Paddy	21	Agriculture
10	42	254	42	Agricultural Plantation	21	Agriculture
11	43	852	43	Other AgricultureLand	21	Agriculture
12	52	8780	52	Grassland	23	Meadow
13	53	2881	53	Swamp	44	Mud flat/marsh
14	54	11248	54	Urbanand Built up Area	1	City center build up
15	61	45699	61	Water Bodies	52	Lake/water
16	55	721	55	Other area	52	Lake/water

Data development

Soil

- Soil_NAFRI in shape file was converted to raster grid 100x100m, by using LC2002 as mask & snap raster
- Changed original soil code to the model code



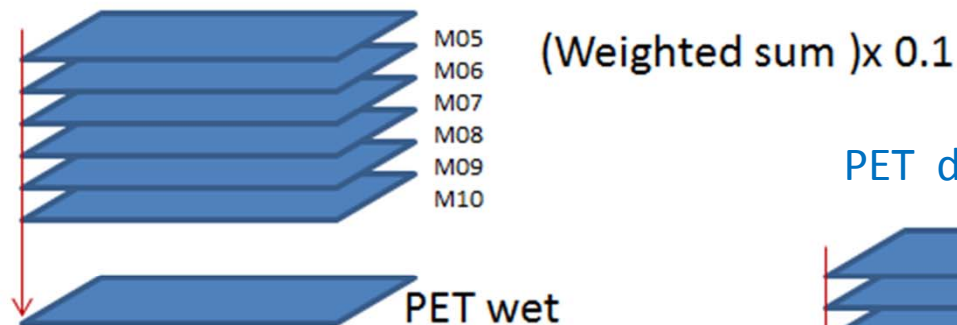
soil_shift						
	Rowid	VALUE	COUNT	TEX_	NEW_CODE	NEW_SOILTYPE
▶	0	1	49141		0	
	1	2	135430	LL	5	Loam
	2	3	140142	CL	9	ClayLoam
	3	4	92382	SL	3	SandyLoam
	4	5	14925	HC	12	Clay
	5	6	33056	SA	1	Sand
	6	7	37413	LS	2	LoamySand
	7	8	704	LC	11	SiltyClay

Data development

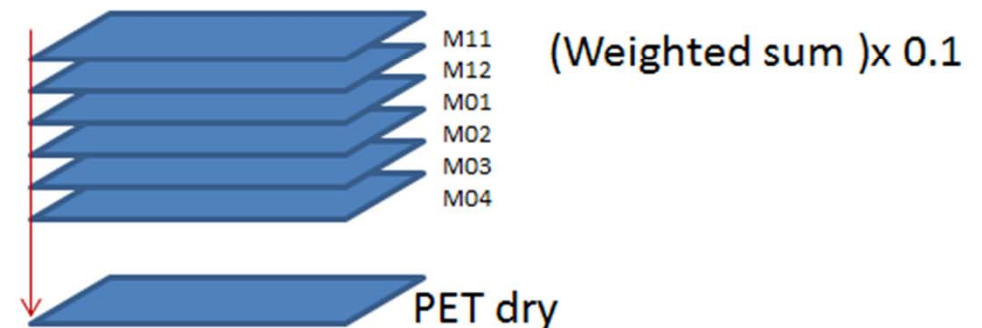
PET

- Monthly MODIS_PET 2014, tile h27 v7 covered part of Myanmar, Laos & Thailand.
ftp://ftp.ntsg.umd.edu/pub/MODIS/NTSG_Products/MOD16/MOD16A2_MONTHLY.MERRA_GMAO_1kmALB/
- MODIS_PET were weighted sum to get PET in wet & dry season, 1x1km grids were then scaled down to 100x100m same size as LC 2002.

PET wet season, 6months: May - Oct



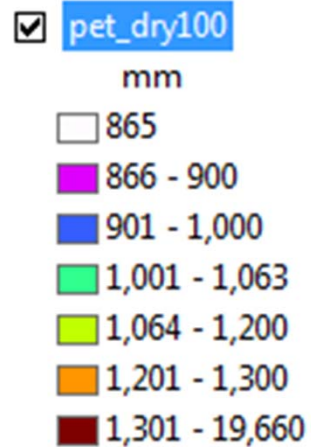
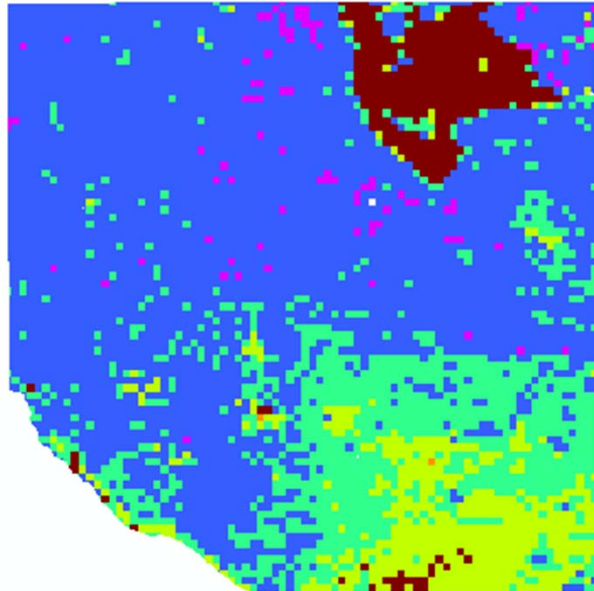
PET dry season, 6months: Nov - Apr



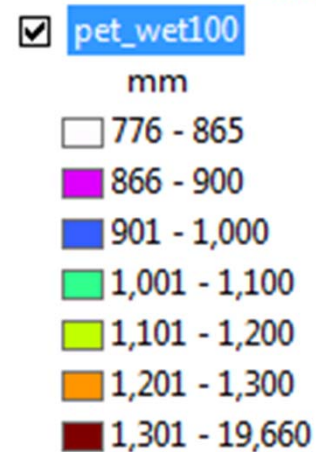
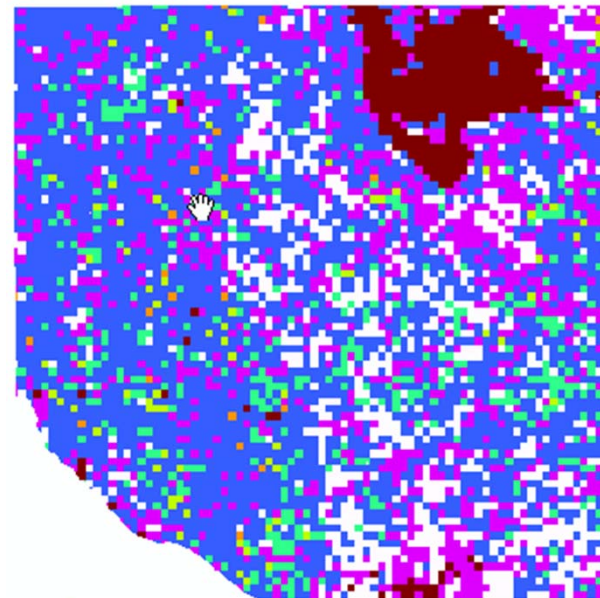
Data development

PET cont.,

PET dry



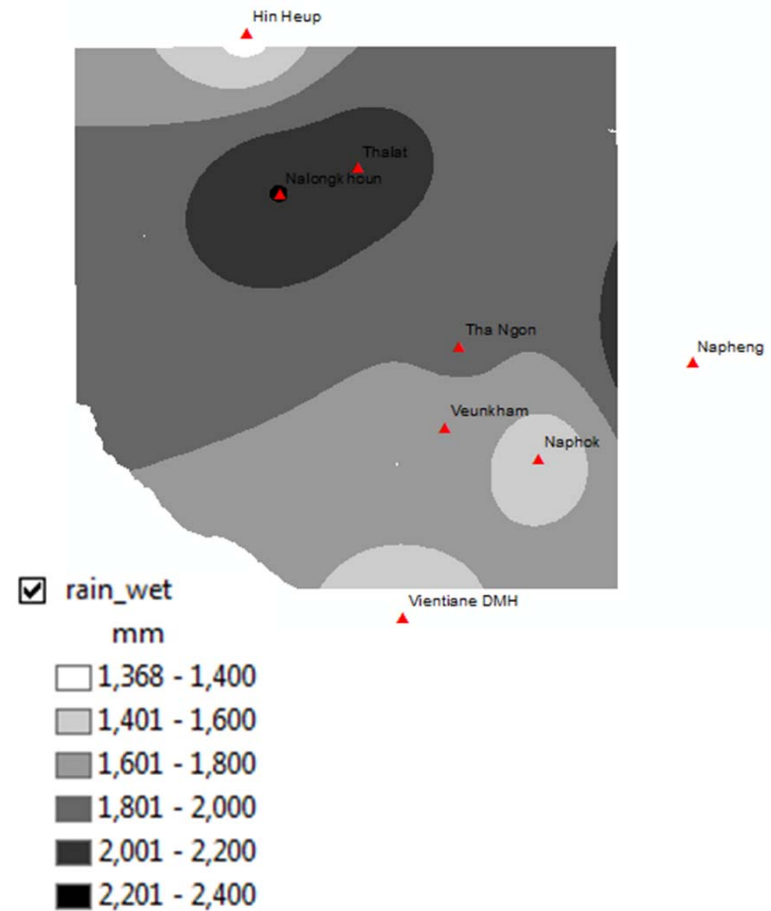
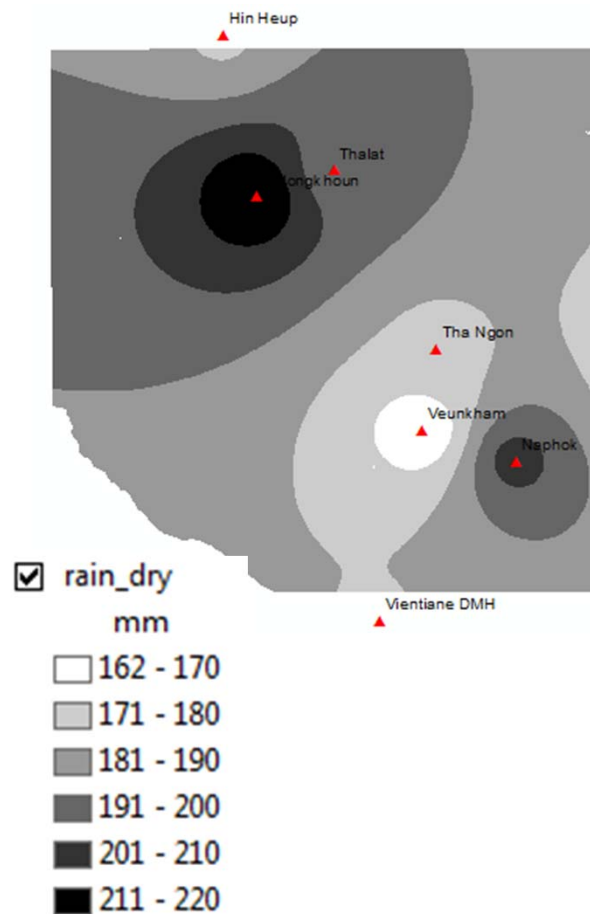
PET wet



Data development

Rainfall

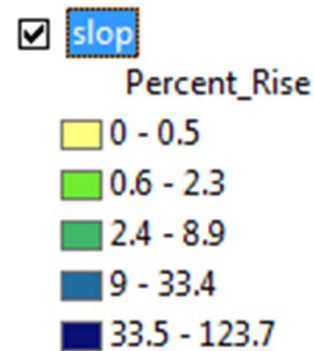
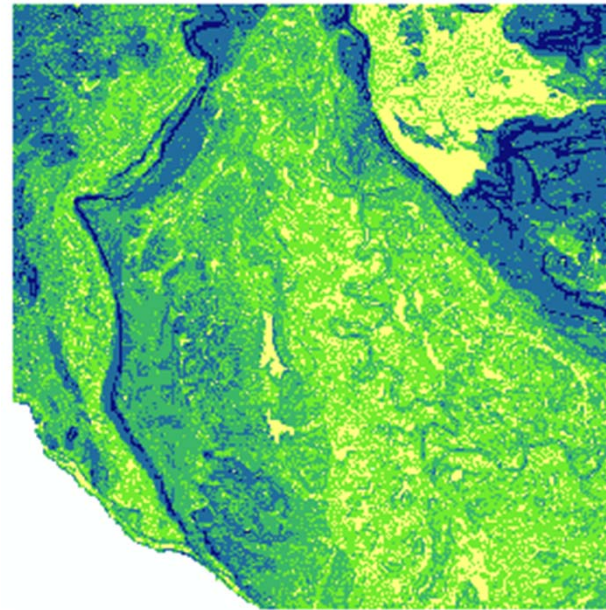
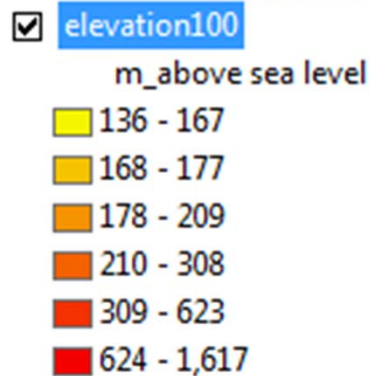
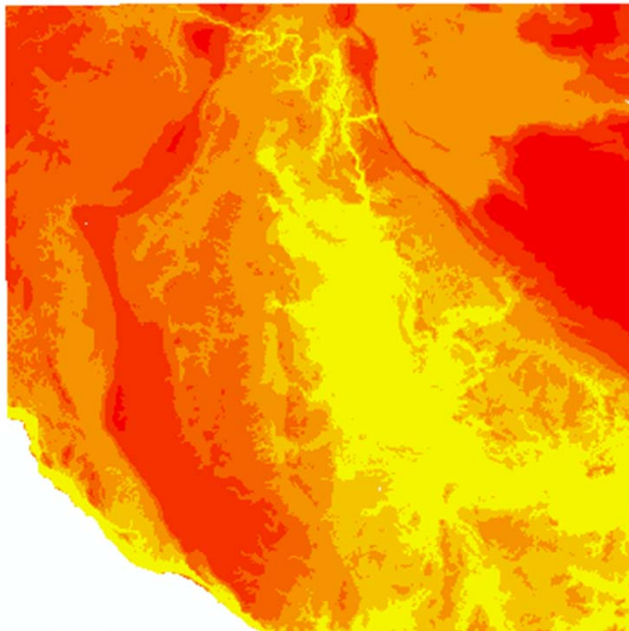
- Average monthly rainfall of 8 hydrological stations, 2009-2014.
- Wet season from May-Oct, same grid size as LC 2002, IDW technique
- Dry season from Nov-Apr, same grid size as LC 2002, IDW technique



Data development

Elevation & Slope(%)

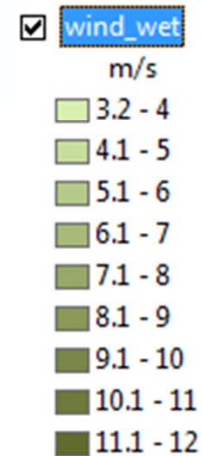
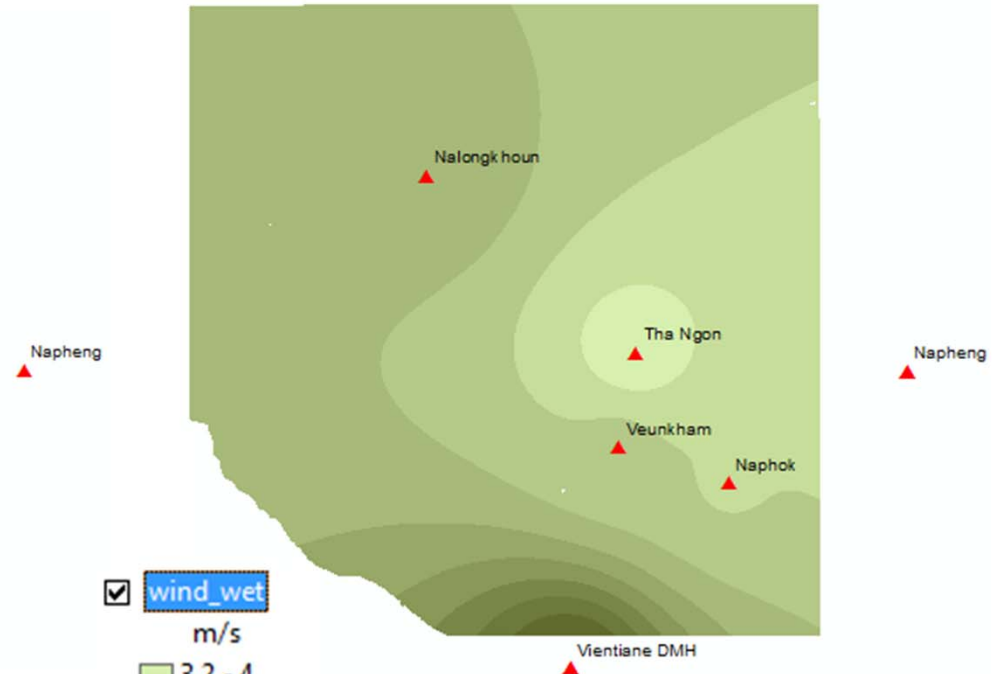
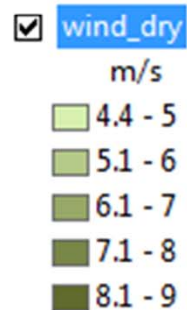
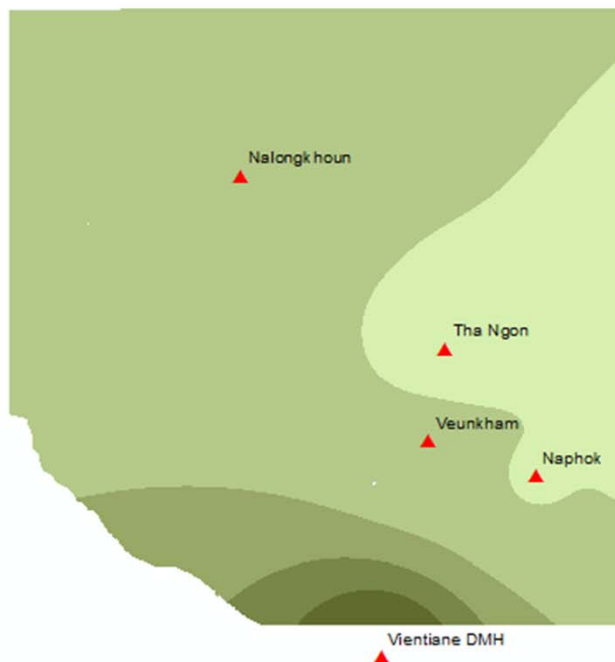
- HydroSHEDS DEM90m was scaled up 100x100m grid



Data development

Wind speed (m/s)

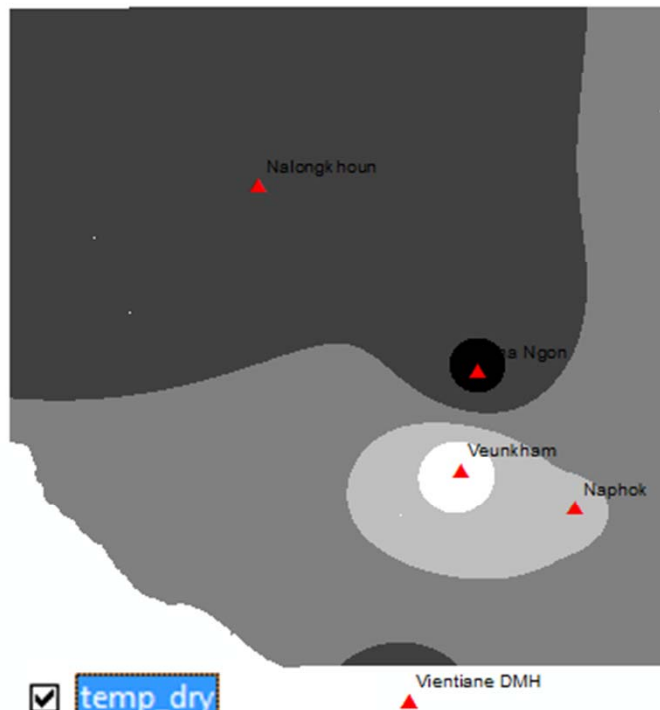
- Average monthly wind speed of 6 stations, 2009-2014.



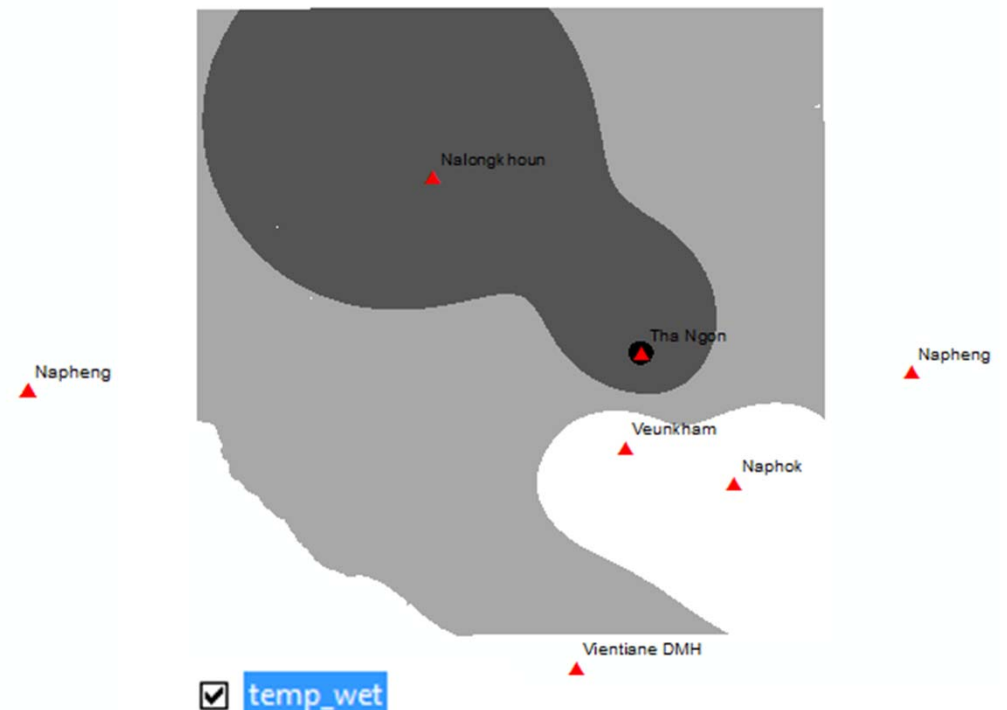
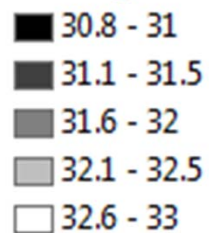
Data development

Temperature (°c)

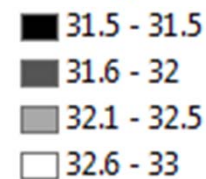
- Average monthly temperature of 6 stations, 2009-2014.



Degree Celsius



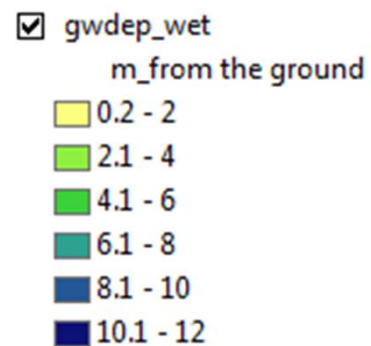
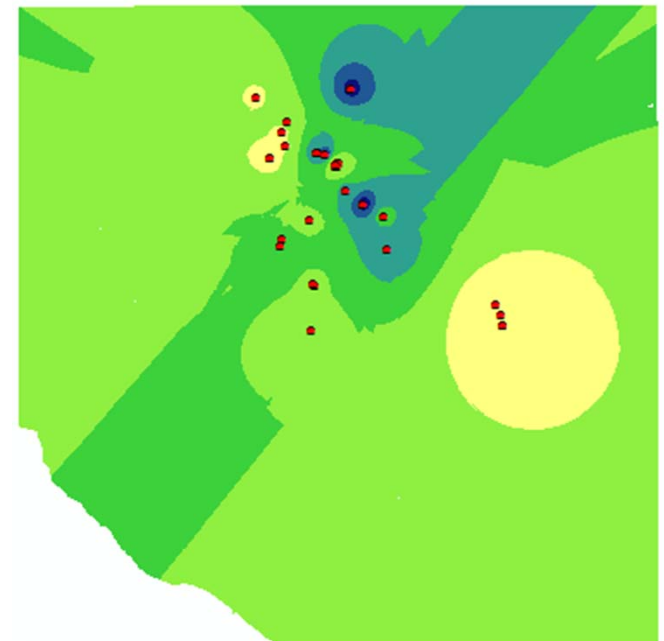
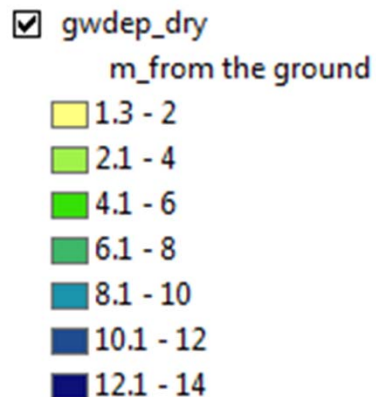
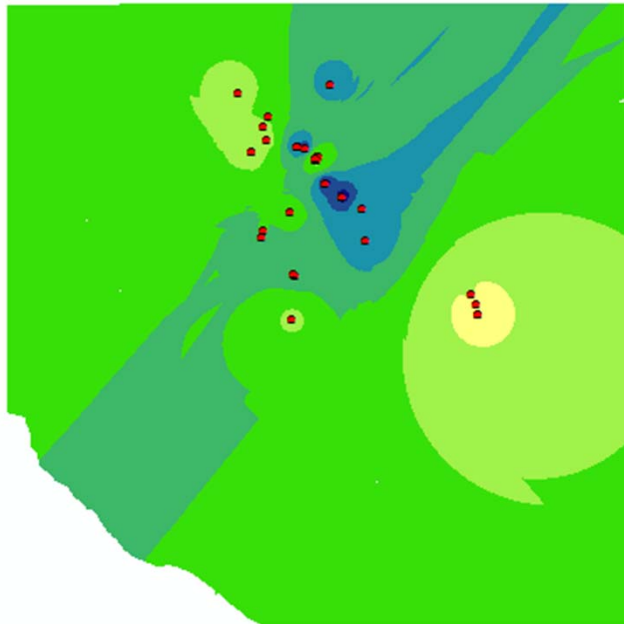
Degree Celsius



Data development

Groundwater depth (m)

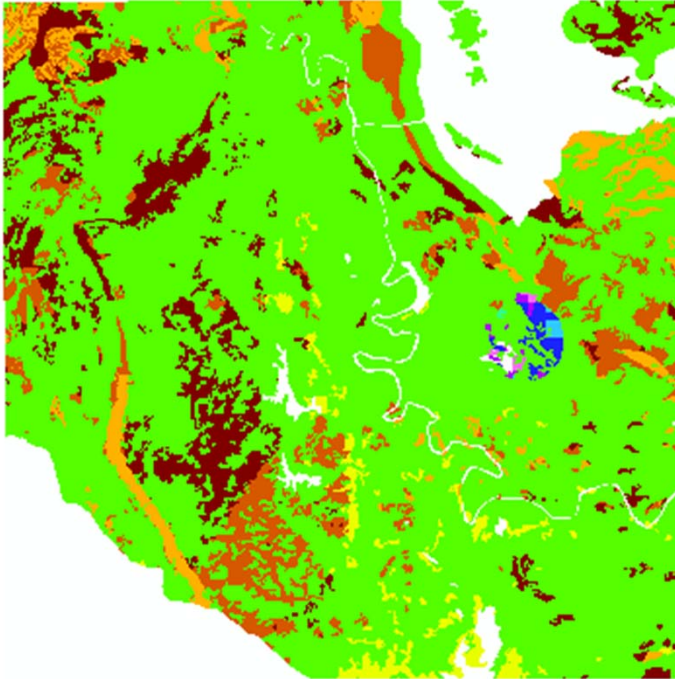
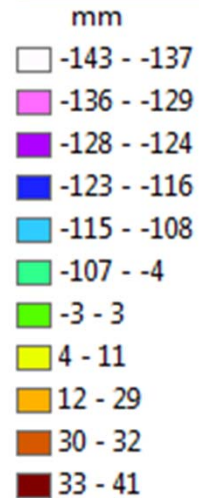
- Average GW depth during wet & dry season are not available at this moment, (monitoring is now being conducted)
- Wet season GW depth measured in Oct (2014) and dry season in Mar (2014)



Seasonal Groundwater Recharge (mm)

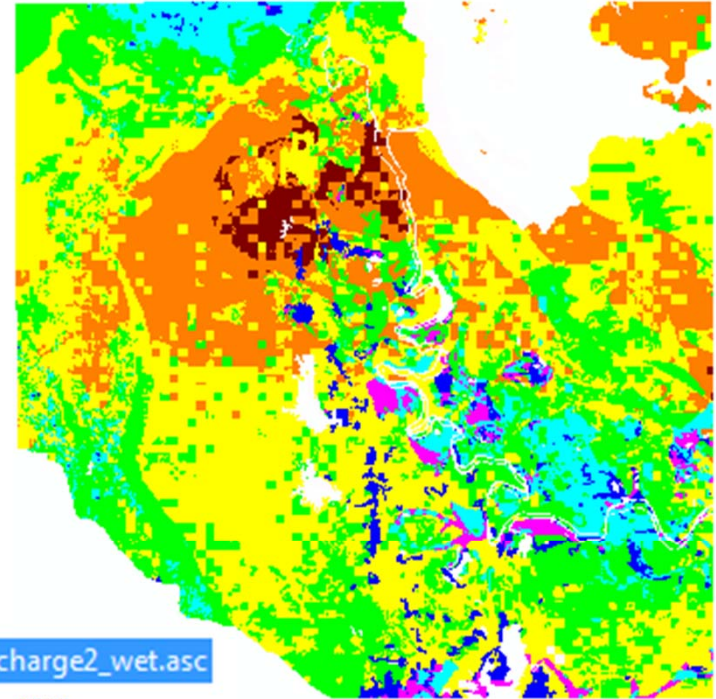
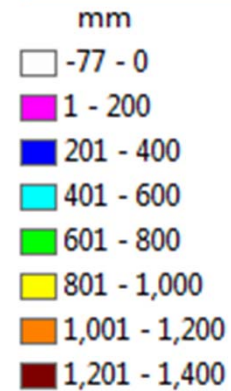
Dry Season

☒ recharge1_dry.asc



Wet Season

☒ recharge2_wet.asc



B.Ekxang Groundwater Recharge (mm)

Wet Season

☒ recharge2_wet.asc

mm

☐ -77 - 0

☐ 1 - 200

☐ 201 - 400

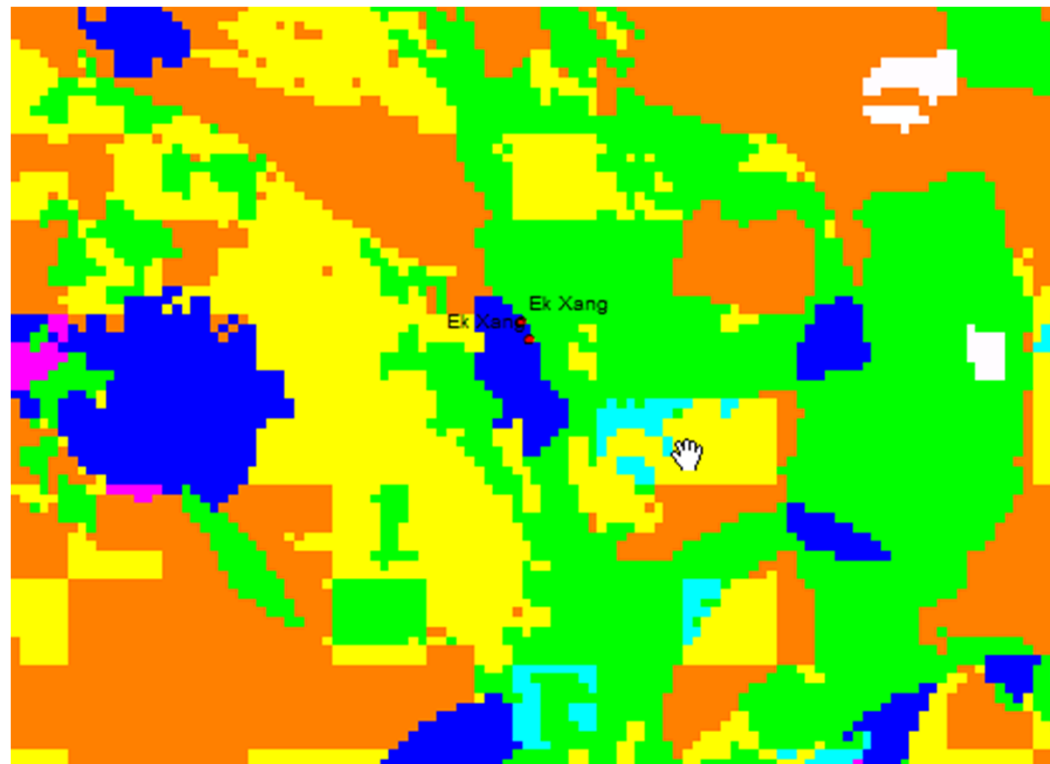
☐ 401 - 600

☐ 601 - 800

☐ 801 - 1,000

☐ 1,001 - 1,200

☐ 1,201 - 1,400



Thank you