Climate downscaling with RegCM3

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Outline of Presentation:

1) **Introdution**
2) **GCM & RCM**
- **RegCM3**
3) **Outputs & Statistical downscaling**
4) **Timeline??**

Why downscale?

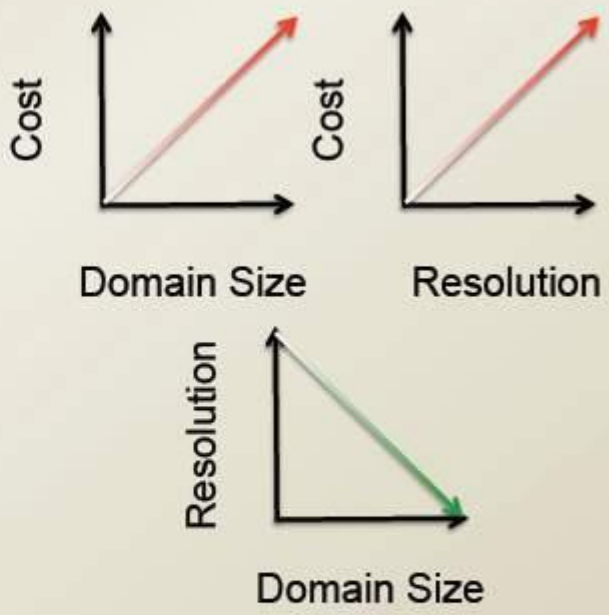
...studies of impacts of projected global warming and climate change on a regional scale necessitates the development and application of scenarios to specific problems... *Cohen(1990)*

...even if global climate models are run at higher resolutions, there will remain the need to downscale the results from such models to individual sites or location for impacts...

... Downscaling techniques, [are] commonly used to address the scale mismatch between coarse resolution global climate model (GCM) output and the regional local catchment scale required for climate change impacts assessment and hydrological modelling... *Fowler and Wilby (2007)*

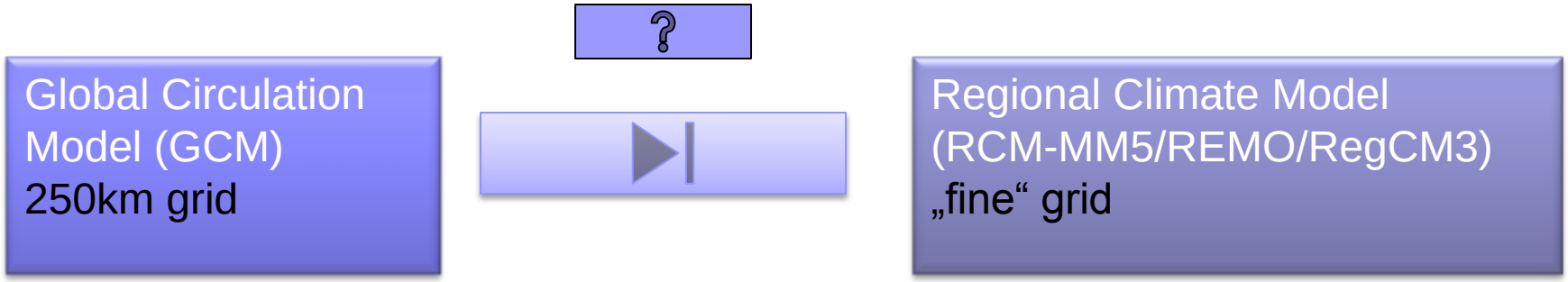
Motivations

- High computational costs for numerical weather/ climate simulations with:
  - Large domains
  - High grid resolutions
- Low grid resolutions frequently reduce quality
  - Subgrid scale parameterizations



Regional downscaling can be a useful compromise

GCM & RCM



MM5-Volta

- ✓GCM coupled climate model simulations of ECHAM4/CRU
- ✓IPCC's IS92a projections
- ✓SVAT for vegetation
- ✓9km simulated grid

REMO-West Africa

- ✓GCM coupled climate model simulations of ECHAM5/MPI-OM
- ✓A1B and B1 scenarios
- ✓IPCC projection for the region-4th AR
- ✓55km simulation grid

RegCM3-Accra

- ✓GCM coupled climate model simulations of ECHAM5/CRU
- ✓A1B and B1 scenarios
- ✓IPCC projection for the region-4th AR
- ✓20km simulation grid

Objectives

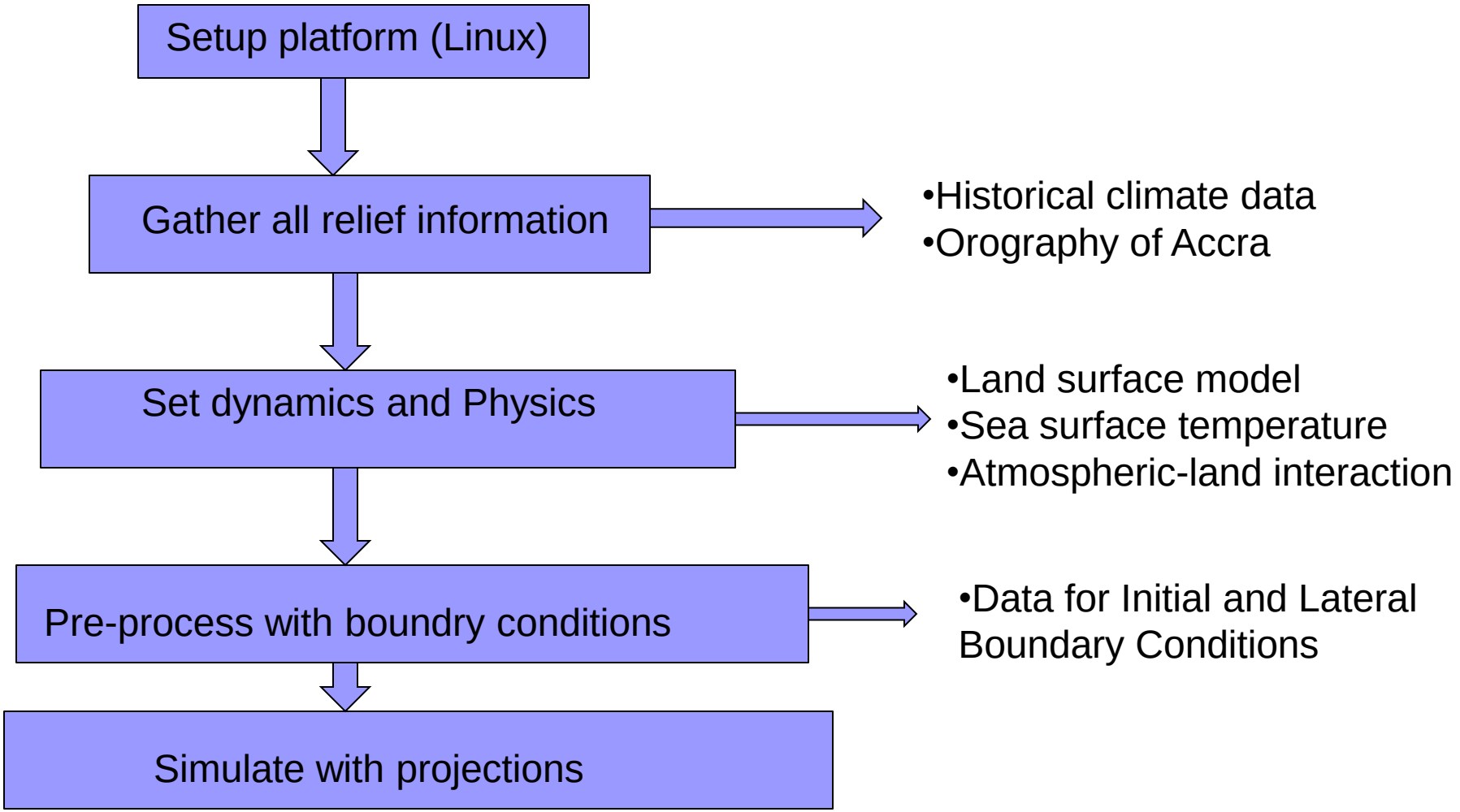
Nest fine-grid Accra area atmosperic model within GCM‘s coarse-grid global model

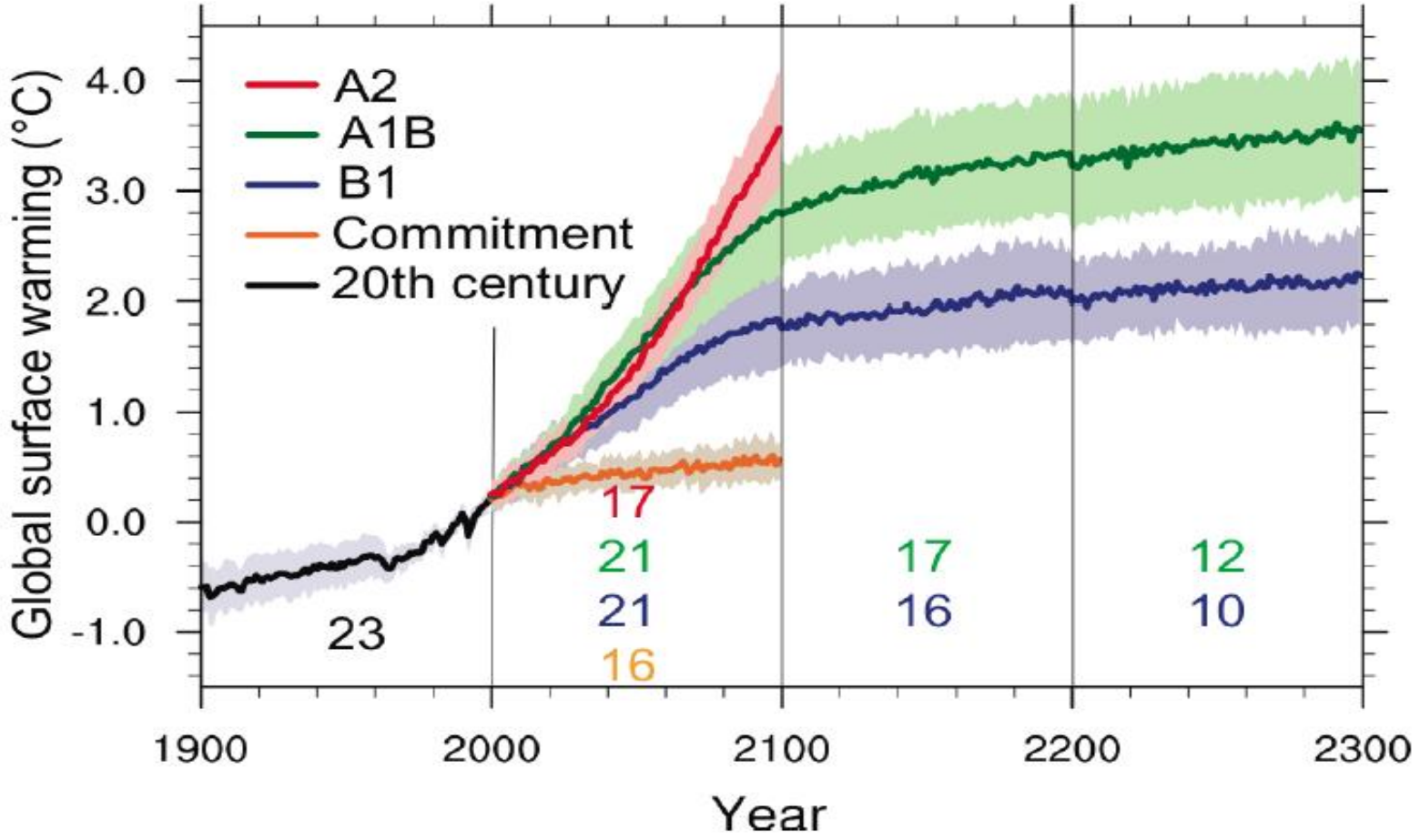
Use current-generation physics and numerics

Simplify the task of climatic input data for modellers

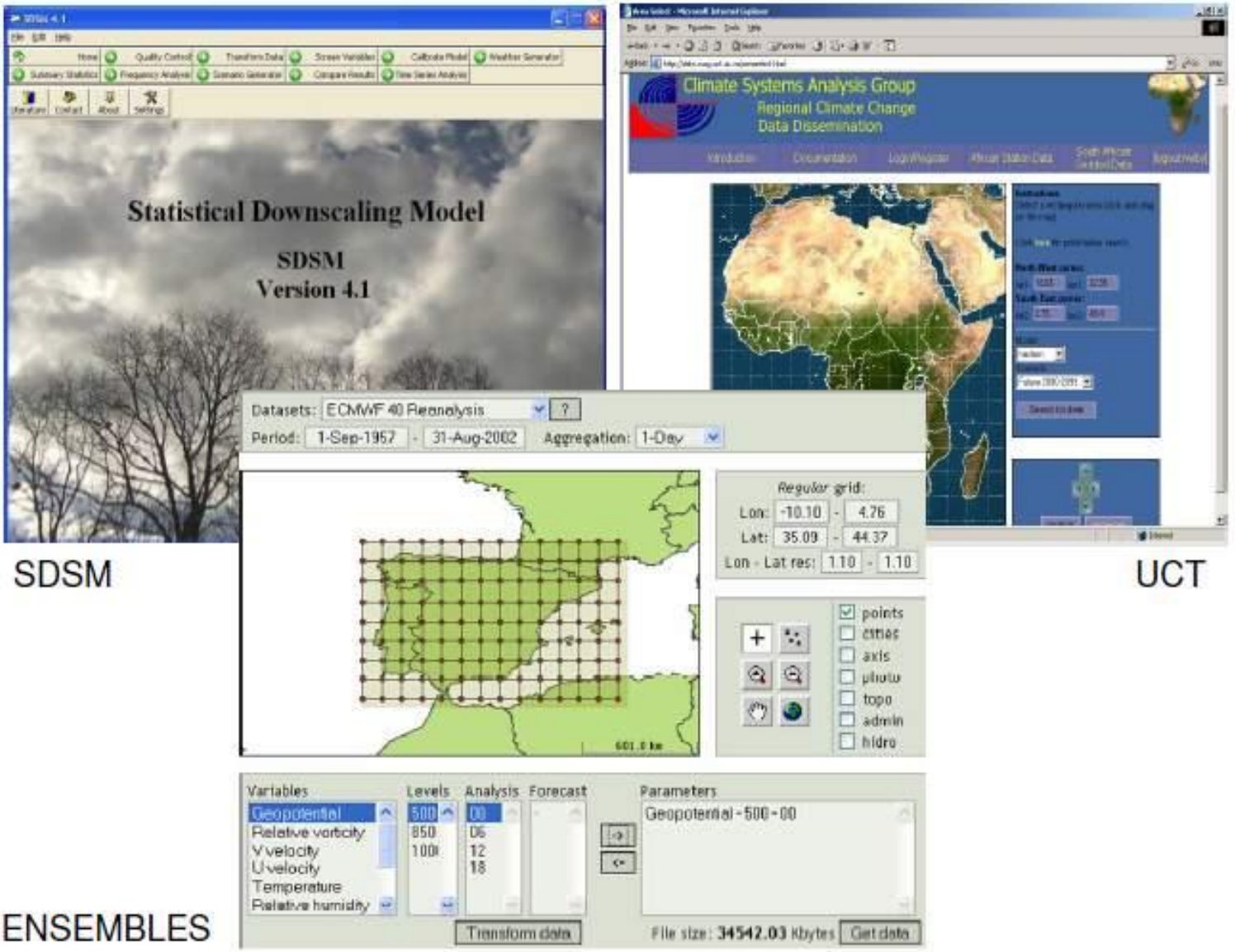
Generate outputs flexible across platforms

Order of activities





Multi-model means of surface warming for the scenarios A2, A1B and B1, shown as continuations of the 20th century simulation. Lines show the multi model means, shading denotes the plus minus one standard deviation range. (Source: http://ipcc-wg1.ucar.edu/wg1/wg1-report.html)



SDSM

UCT

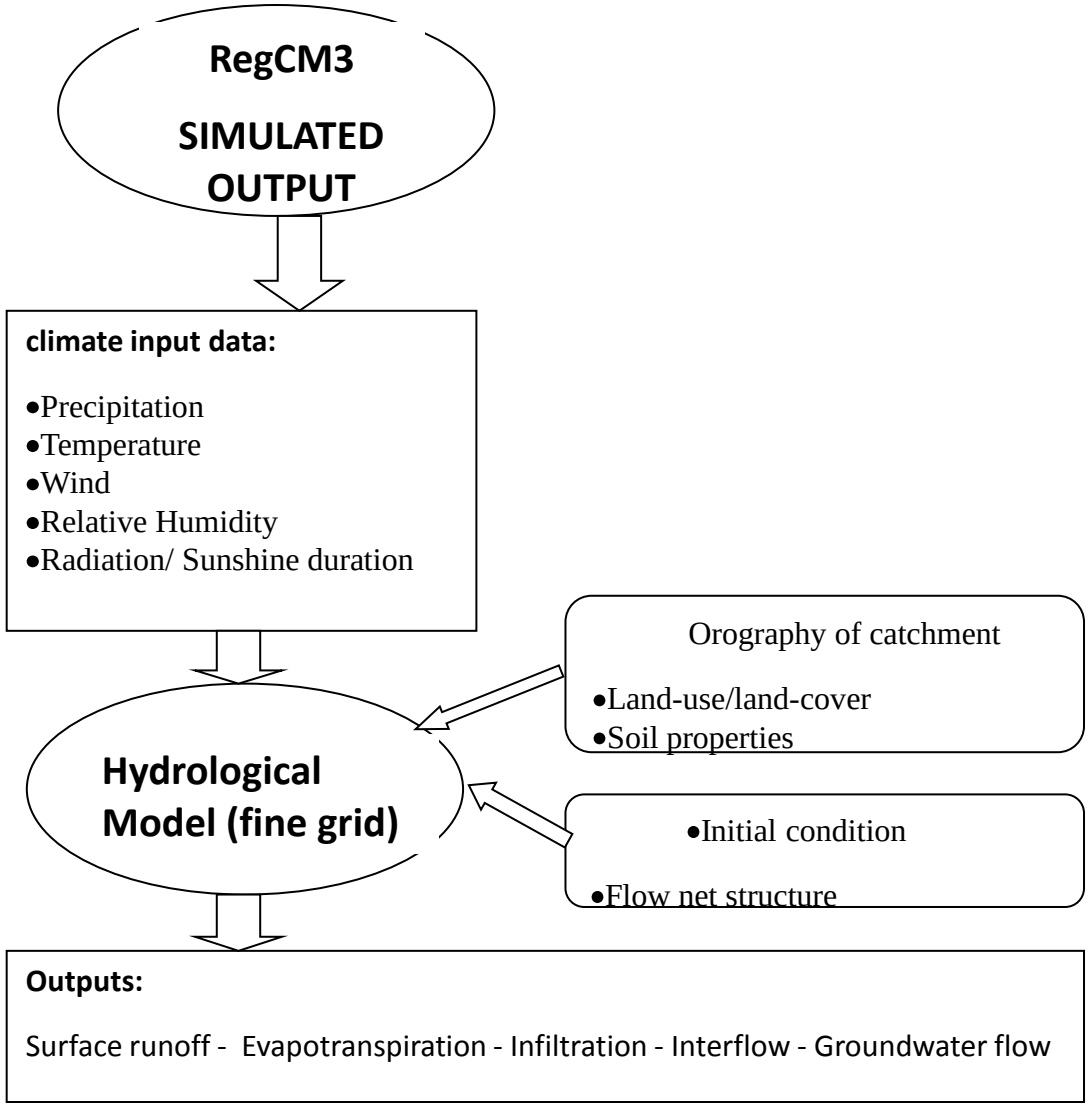
ENSEMBLES

Summary

Developing a regional downscaling for multiple weather and climate application

Re-analysis data will be run within the downscaling system

Further use of Model outputs and Simulation



Protocol for the analysis of the hydrological dynamics

Timeline....

We will work HARD to get outputs ASAP!!!

Thank you

„when the wells *and streams* are dry we know the worth of water“ – Bejamin Franklin (1706-1790)