Updated Information of the GRIP-GL Routing Products

This document is to track the updates and changes in the GRIP-GL routing products. There is another standalone document [Variable_list] (*coming soon!*), in which definitions of the variables and parameters included in the products are clarified. We suggest that users check these two documents before applying the routing products to your cases.

We would like to thank Ming Han for his support on the routing toolbox. Details about the routing products generation, such as the input data sets, watershed-lake-river delineation procedures, and *a priori* parameter estimations, can be referred to the relevant article by Han et al. (2019), which is currently under preparation.

If you have any specific needs, such as post-processing problems, variables and parameters to your interests, and any questions about the products, feel free to let us know, and we would like to update them into the products. Here are the correspondences:

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Description of the routing products

Three versions routing products are provided in terms of the watershed discretization scheme:

1) Version #1, lumped version

This version provides the catchment boundaries of the 212 gauges, as well as river networks and the catchment-forcing-grid overlay results. Three shapefiles are included:

  a. Lumped catchment boundaries of the 212 gauges.

  b. Stream networks for the entire Great Lakes (clip may need for a specific catchment).

  c. Catchment-forcing-grid overlay results.

2) Version #2, subwatershed without lakes version

This version discretized the 212 catchments with more subwatersheds to preserve more geo-spatial information. Three shapefiles are included:

  a. Catchment boundaries with subwatersheds of the 212 gauges.

  b. Stream networks for the entire Great Lakes (clip may be needed for a specific catchment).

  c. Catchment-forcing-grid overlay results.

3) Version #3, subwatershed with lakes version

More than Version #2, lakes with area greater than 5 km^2 (around 1000 lakes in the entire Great Lakes basin) are considered in this version. Three shapefiles are included:

  a. Catchment boundaries with subwatersheds and lakes of the 212 gauges.

  b. Stream networks for the entire Great Lakes (clip may be needed for a specific catchment).

  c. Lakes for the entire Great Lakes (clip may be needed for a specific catchment).

  d. Catchment-forcing-grid overlay results.

Updated history

- **11/11/2019, Version 1.0.1**

We fixed some known issues in v1.0 product. The lumped version product was also improved. Version #3 is currently not included, and we are pushing it to be there ASAP.

Updates description:

1) Fixed bugs in subwatershed area and river slope calculation.

   Two columns of area (which only differ in significant digits) were provided.

   Only the mean river slope and mean basin slope were preserved.

2) In catchment shapefiles, we added perimeter, unadjusted area, adjusted area, area error, and other important information from the gauge info file.

3) In catchment-forcing-grid overlay shapefiles, we added perimeter, unadjusted partial area, adjusted partial area, and areal ratio to help users conduct an aggregation.

4) Optimized the lumped version (#1). In v1.0 product, a lumped catchment could have more than one polygon if there were other upstream gauges. We also found that some lumped catchments have NULL values for river length if they are very small. Thus, we made some important changes in this version:

   We merged the redundant polygons to ensure only one polygon corresponds to one gauge.

   We re-delineated stream networks using the same parameter with version 2 and 3. This ensures that river geometry characteristics and the initial routing parameters of the three versions in the same polygon is consistent.

- **11/05/2019, Version 1.0**

We released the routing products Version #1 and Version #2. There are two known issues in the shapefile attribute table:

1) The catchment area calculated by ArcGIS, denoted as attribute [Area2] in catchment shapefiles of both versions, can be wrong in some region. However, area in the catchment-forcing-grid overlay shapefiles is correct.

2) Three slope columns are included in this version, and this could be ambiguous.

We have located the bugs causing these issues and will be releasing an improved version soon!