GD5102 Techniques for Data Analysis

Assignment 01: Correlation & Regression

Report submission date: 09-Sep-2020

Data, Material & Instruction

- Data: File Project.dat consists of the following variables: Lat (deg), Lon (deg), Gradient of Sea Surface Height ΔSSH (m), Gradient of Geoid Undulation ΔUND (m), Gradient of Dynamic Topography ΔDOT(m)
- Material: PPT slides, some e-books
- Submission: Before 09-Sep-2020, 00:00:00

To : course.dudy@gmail.com
Subject : GD5102-TAD
File : **NIM_A01_FirstName_LastName.pdf** (*insert your matlab-script to the report*)

Tasks A

1. Use the autocorrelation functions [auto_correlation.m]. Plot at the same frame the spatial autocorrelation functions of variables ΔSSH, ΔUND and ΔDOT. Analyze (as much as you can) the autocorrelation pattern of each variable & possible relation among the variables. Can you guess which variable is dominated by long wavelength and which is by random pattern?
2. Use the cross-correlation functions [cross_correlation.m]. Plot at the same frame the spatial cross-correlation functions between ΔSSH-ΔUND and ΔSSH-ΔDOT variables. Analyze (as much as you can) the cross-correlation pattern of each pair. Can you guess which pair is highly correlated and which is not?
3. Create Matlab scripts to generate scatter plots between ΔSSH-ΔUND and ΔSSH-ΔDOT. Do the regression analysis to quantify the correlation level and bias of each pair. Interpret your results.

Tasks B

1. Select your own data set and repeat the task A. How well can you understand the behavior of your data? [The selected data set should be very close to your thesis work].
2. Discuss general applications of correlation and regression in geoscience data analysis. How could they possibly be helpful in accomplishing your thesis work?

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