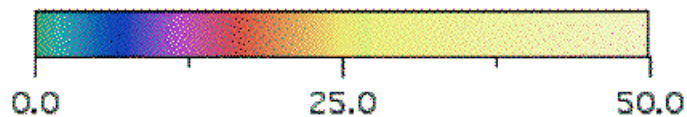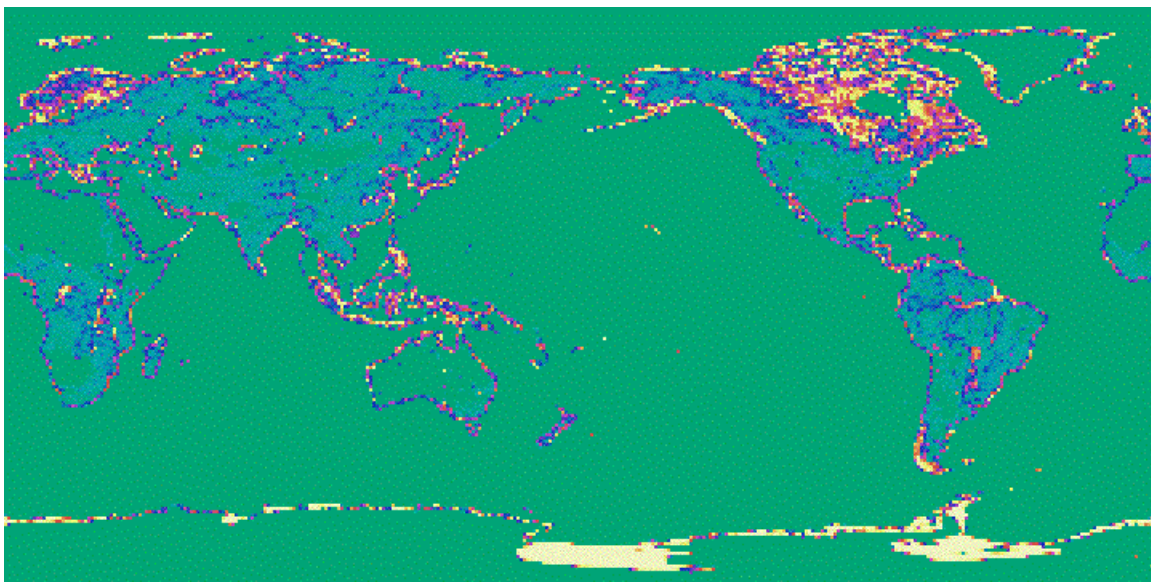# Coastal Water Percentage Issue

Summary of Problem

The surface IGBP maps that are used to create the scene type vector on the SSF do not correctly take into account the water percentage map. The 10-minute IGBP maps were created by choosing the predominant land IGBP type for any region that is at least 10% land (instead of just calling it water). Users were supposed to use the companion water percentage map to get true water percentage. The Clouds Subsystem correctly uses both maps in the cloud retrievals. However, only the IGBP map is passed to convolution. Therefore, the water percentage is generally underestimated in coastal regions. The effect is greatest for very jagged coasts (e.g. Tierra del Fuego and most of northern Canada).

Frequency and Magnitude of Problem

The map below shows where the problem occurs. This map represents the difference between the true water percentage and the water percentage derived from the IGBP maps on a 1° latitude by 1° longitude grid. Since most differences are small (< 10%), I've expanded the scale between 0-20%.

The large differences near Antarctica are not a problem. The water percentage file classifies the ice shelves as water. However, these coastal areas are redefined as sea ice during processing and the resulting water percent should be accurate

The second figure shows the frequency of occurrence of the water percentage difference for coastal regions (0 < water percentage < 100). Globally, the total number of coastal regions is 17179, which is 26.5% of the total of 64800 1° region.
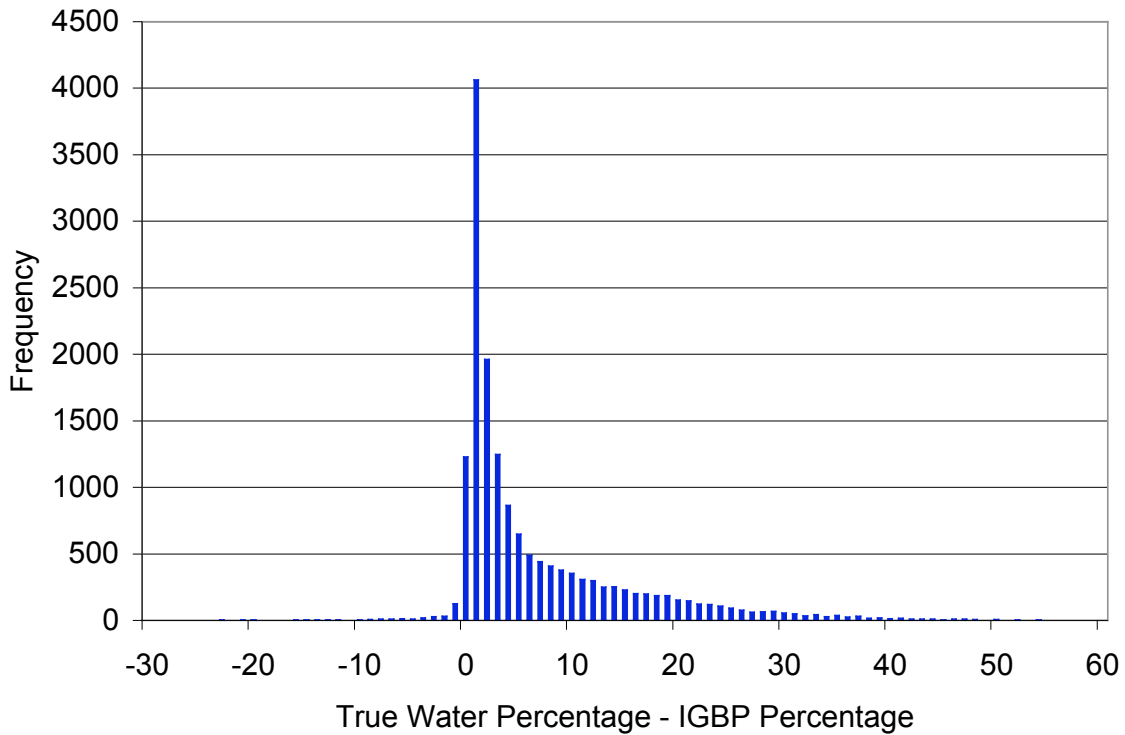
The frequency chart excludes regions south of 60S to remove the Antarctic coast points. For regions north of 60S, 15893 of the 54000 regions (29.5%) are coast. The maximum difference is 66% and the minimum is –49%. The differences are also summarized in the Table below.

Percent Difference	Regions
-50 to -41	2
-40 to -31	2
-30 to -21	6
-20 to -11	17
-10 to -1	247
0	1227
1 to 10	10852
11 to 20	2252
21 to 30	908
31 to 40	290
41 to 50	75
51 to 60	12
61 to 70	3

Obviously the vast majority of the regions have underestimated water percentage using the IGBP. However, 77.5% of the regions have coastal estimates from the IGBP map within ±10% of the true water percentage. Only 8% have errors are in excess of 20%.

Effect of Error

The effect on fluxes on the SSF has not been established. The statistics in this document are based on 1° regions. Individual CERES footprints are smaller (~20 km at nadir) a similar distribution of errors is expected. As footprints grow with viewing zenith angle, it is likely that water percentage errors will decrease.