

19) POSTER

An improved soil water budget model for predicting drought stress-related forest flammability in the Amazon Basin.

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The RisQue (Risco de Queimadas) spatial model of flammability based on soil moisture stocks, under development since 1998, continues to evolve. The soil map of maximum Plant Available Water (PAW), based on soil texture information from over 1,500 field samples, has been expanded from the Brazilian Legal Amazon region to cover the entire Amazon hydrographic basin. Enhanced meteorological data provided by CPTEC now cover this same region, and Penman-Monteith estimated Potential Evapotranspiration has superseded previous estimates calculated after Thornthwaite, using GOES-derived radiation fields. All spatial interpolation is now done via Kriging. The vegetation mask, used to constrain deep soil water estimations for forests only, has been updated to reflect recent deforestation, and the spatial resolution has improved. Sensitivity of the model to Penman-Monteith Evapotranspiration estimates were analyzed by running the model with ET at -15%, -5%, +5% and +15% of actual estimates. A 5% reduction in ET resulted in a 60% decrease in the area of depleted soil moisture stocks, and a 38% decrease in the area of stocks diminished to less than 250mm of water in a 10m column of soil. 5% increase in ET resulted in a two-fold increase in area of depleted soil moisture stocks, and a 38% increase in the area suffering depletion to less than 250mm. We find fair agreement between model output and field measurements of plant-available soil water to 10 m depth, with actual soil moisture measured using TDR at our field stations in the FLONA Tapajós and in Paragominas; average model estimates of soil water stocks averaged 19% lower than field measurements for the FLONA Tapajós, and 8% lower for Paragominas.