

SIMULATION OF SOIL WATER REGIME IN SOFIA REGION USING SWAT AND NEWHALL MODELS

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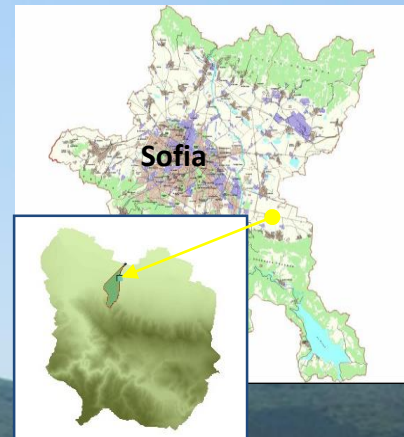


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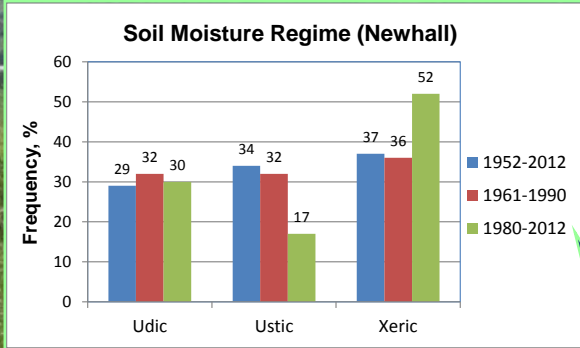
The objective of this study is to characterize the soil moisture regime of Deluvial meadow soil in Sofia region.

The soil moisture regime is classified according to Soil Taxonomy (Soil survey staff, 2010) using the model of Newhall (1972) for each year of the period 1952-2012. The SWAT model was run on a small watershed in Eastern part of Sofia field.

Models were run on monthly and daily basis correspondingly for the period 1952-2012 (Newhall) and 1952-1999 (SWAT) with local measured data for precipitation, air temperature, relative humidity, wind speed and solar radiation.

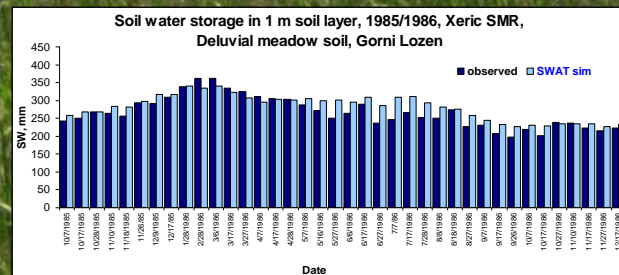
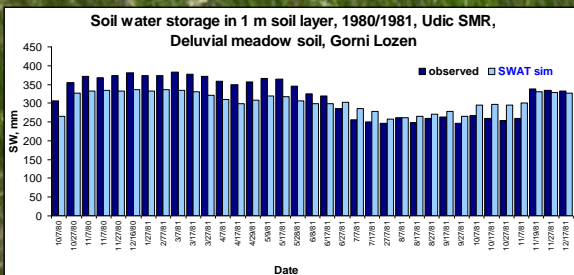
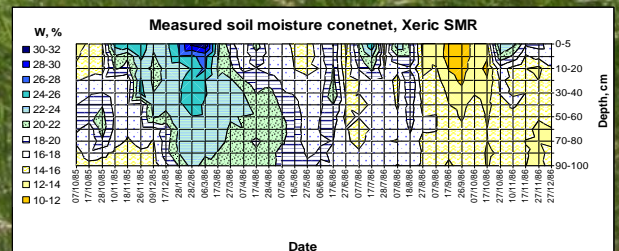
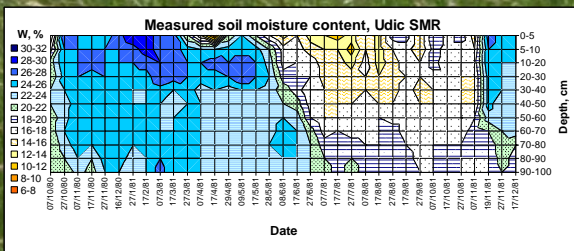


Horizon	Depth, cm	Clay, %	Silt, %	Sand, %	BD, g.cm ⁻³	K _f , mm.hr ⁻¹	Org. C, %
A ₁	0-11	45.2	39.6	15.2	1.28	180	2.16
A ₁	11-19	48.1	37.8	14.1	1.44	90	0.93
A ₂	19-56	47.1	38.4	14.5	1.53	0.07	0.78
AC ₁	56-100	43.3	32.7	24.0	1.55	20	0.69



The frequency of the moisture regimes in normal years of the periods 1952-2012 and 1961-1990, are as follows: 29 and 32% - Udic, 34 and 32% - Ustic, 37 and 36% - Xeric, correspondingly. The simulation results show that soil moisture regime varies significantly throughout the years in the region of Sofia and it is not possible to point out the dominant type even for normal years. The obtained information is used for detecting soil moisture trends in the region. During the last period (1980-2012), the frequency of Xeric regimes in normal years increases up to 52% on account of Ustic type, which diminishes down to 17%.

Simulations are compared with measurements of soil water content of Deluvial meadow soil in the experimental field Gorni Lozen, situated within the watershed



The model outputs show good coincidence ($R^2=75\%$) between measured and simulated soil water storage in 1m layer of Deluvial meadow soil. Further calibration is needed in order to use the model for mapping of soil moisture regime on larger areas.

