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A history of TOPMODEL

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Beven et al. A History of Topmodel
Electronic Supplement
Time line of Topmodel and related developments

Year	Development	Topographic analysis	Hydrograph Prediction (with catchment) and Topmodel Software	Flood Frequency Estimation by continuous simulation (with catchment)	Land Surface Parameterisations with explicit energy budegt components	Water Quality Prediction (with catchment)	Parallel Developments
1975	First publication of the Topographic index	Kirkby 1975 (manual methods)	Kirkby, 1975 (East Twin)				
1977	First conference publication of application of Topmodel	Beven and Kirkby, 1977 (manual methods)	Beven and Kirkby, 1977 (Crimple Beck)				
1979	First journal publication of application of Topmodel to Crimple Beck data		Beven and Kirkby, 1979 (Crimple Beck)				
1981	First publication of O'Loughlin Wetness index						O'Loughlin, 1981
1982	First formulation of soil-topographic index		Beven (University of Virginia research report) (White Oak Run)				
1983	Derivation of topographic index for geometric hillslopes	Beven and Wood, 1983, (analytical relationships)					
1986	First use of soil-topographic index in flood frequency estimation			Beven, 1986a,b, 1987 (Plynlimon)			
1987	First dimensionless form of Topmodel based on a gamma distribution representation of the topographic index	Sivapalan et al. (1987)	Sivapalan et al., (1987)				

Year					
1991	First published derivation of topographic index from digital terrain analysis	Quinn et al. 1991 (multiple downslope direction partitioning)			
1991	First use of reference level concept		Quinn et al., 1991 (Booro-Borotou)		
1992	First application of Topmodel to water quality prediction				Robson et al.,1992 (Hafren, Plynlimon))
1993	First use of Topmodel with GLUE uncertainty estimation		Beven, 1993; Freer et al., 1996 (Maimai)		
1993	Investigation of sensitivity to space and time resolution		Bruneau et al. (1993) (Naizin); Zhang and Montgomery (1994); Wolock and Price (1994)		
1993	Use of Topmodel concepts within the RHESSyS model				Band et al. (1993)
1994	Critique of steady state assumption in estimation of contributing areas				Barling et al., 1994
1994	Topmodel first used as basis of Land Surface Parameterisation			Familglietti and Wood, 1994 (TOPLATS)	
1995	First publication of Topkapi concepts				Todini, 1995
1996	Generalisation of transmissivity profiles to parabolic and linear functions and index		Ambroise et al. 1996a (Ringelbach)		

Year	Development	Reference	Reference	Reference
1997	First use of Topmodel for continuous simulation flood frequency estimation			Blazkova and Beven 1997 (Jizera catchments)
1997	Implementation of Topmodel in Matlab Simulink		Romanowicz, 1997, (Severn, Plynlimon)	
1997	Power law transmissivity functions and index		Iorgulescu and Musy, 1997; Duan and Miller, 1997	
1997	Generalised recession curve and index		Lamb et al., 1997 (Saeterbekken)	
1997	Introduction of bedrock surface topographic index		Freer et al., 1997 (Maimai, Panola)	
1998	Constraint of Topmodel uncertainty and back-calculation of local tranmissivities from water table information		Lamb et al., 1998 (Saeterbekken); Blazkova et al. 2002 (Uhrliska)	
1997	Reducing dependence of predictions on grid resolution	Saulnier et al. 1997a,b		
1997	Including spatially variable soil depths in Topmodel		Saulnier et al. 1997c (Real Collobrier)	
1997	Integration of TOPMODEL with a snowmelt model		Holko and Lepisto 1997	
1998	Fuzzy estimates of saturated areas into the model evaluation process		Franks et al. 1998 (Naizin)	
1998	Integration of TOPMODEL and GASFLUX vegetation-atmosphere excahnge model		Quinn et al. 1998	
1999	First gridded subsurface kinematic wave model, DVSHM			Wigmosta et al., 1994

Year	Description				
1999	Use of Topmodel for Flood frequency simulation under climate change with uncertainty			Cameron et al., 1999, 2000a,b; Blazkova and Beven, 2002	
2000	TOPURBAN: TOPMODEL modified for urban catchments				Valeo and Moin 2000
2000	Modified Topmodel for shallow subsurface flows		Scanlon et al. 2000 (Brokenback Run)		
2001	First publication of Dynamic Topmodel		Beven and Freer, 2001 (Slapton Wood)		
2001	Topmodel used in MeteoFrance land surface parameterisation			Habets and Saulnier (2001) (ISBA-Topmodel)	
2002	Conceptual changes to TOPMODEL for shallow subsurface flows		Walter et al. 2002		
2003	Topmodel used in UK MetOffice land surface parameterisation			Essery et al. (2003) (MOSES)	
2003	Applicaton of Dynamic TOPMODEL with different landscape structures		Peters et al. 2003 (Panola)		
2003	Multiperiod conditioning of Tomodel parameters in GLUE		Freer et al. 2003 (Panola)		
2003	Use of topographic index for disaggregation of passive satellite soil moisture data		Pellenq et al. 2003 (Nerrigundah)		
2004	Fuzzy estimates of water table depths in calibration of Dynamic Topmodel		Freer et al. 2004 (Mamai)		
2004	TOPNET: Networked version of Topmodel	Bandargoda et al. 2004 (TOPSETUP)			Bandargoda et al. 2004

2006	Fractal downscaling of topographic index	Pradhan et al. 2006, 2008		
2007	Use of Dynamic Topmodel for water quality simulation			Page et al. (2007) (Hafren, Plynlimon)
2009	Use of topgraphic index in SCIMAP			Lane et al. (2009)
2009	First application of Limits of Acceptability to condition Dynamic TOPMODEL	Liu et al. 2009. (Attert)		
2011	Topmodel used in updated MetOffice land surface parameterisation		Best et al. (2011) (JULES)	
2011	Implementation of Topmodel in R	Buytaert, 2011, 2018		
2015	Version of Dynamic Topmodel in R	Metcalfe et al. (2015) (Brompton)		
2015	Distributed Topmodel			Gao et al. (2015)
2016	Dynamic Topmodel used in land surface parameterisation		Charney et al. (2016) (HydroBLOCKS)	
2019	First application of DECIPHeR model with new subsurface formulation, large scale routing and different DTA approaches	Coxon et al. (2019) (Whole of GB)		

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