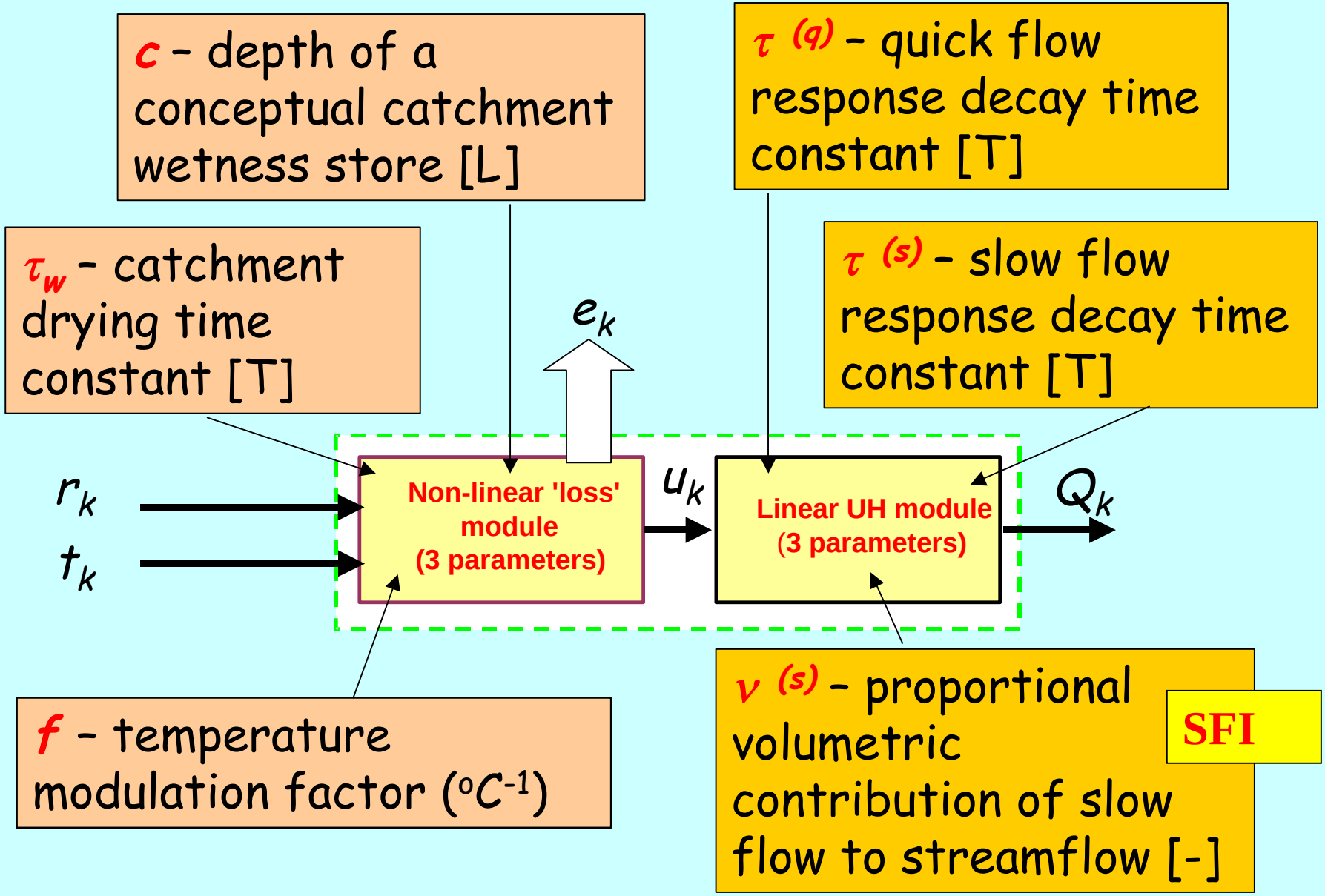
IAHS Gothenburg July 2013 – HW15

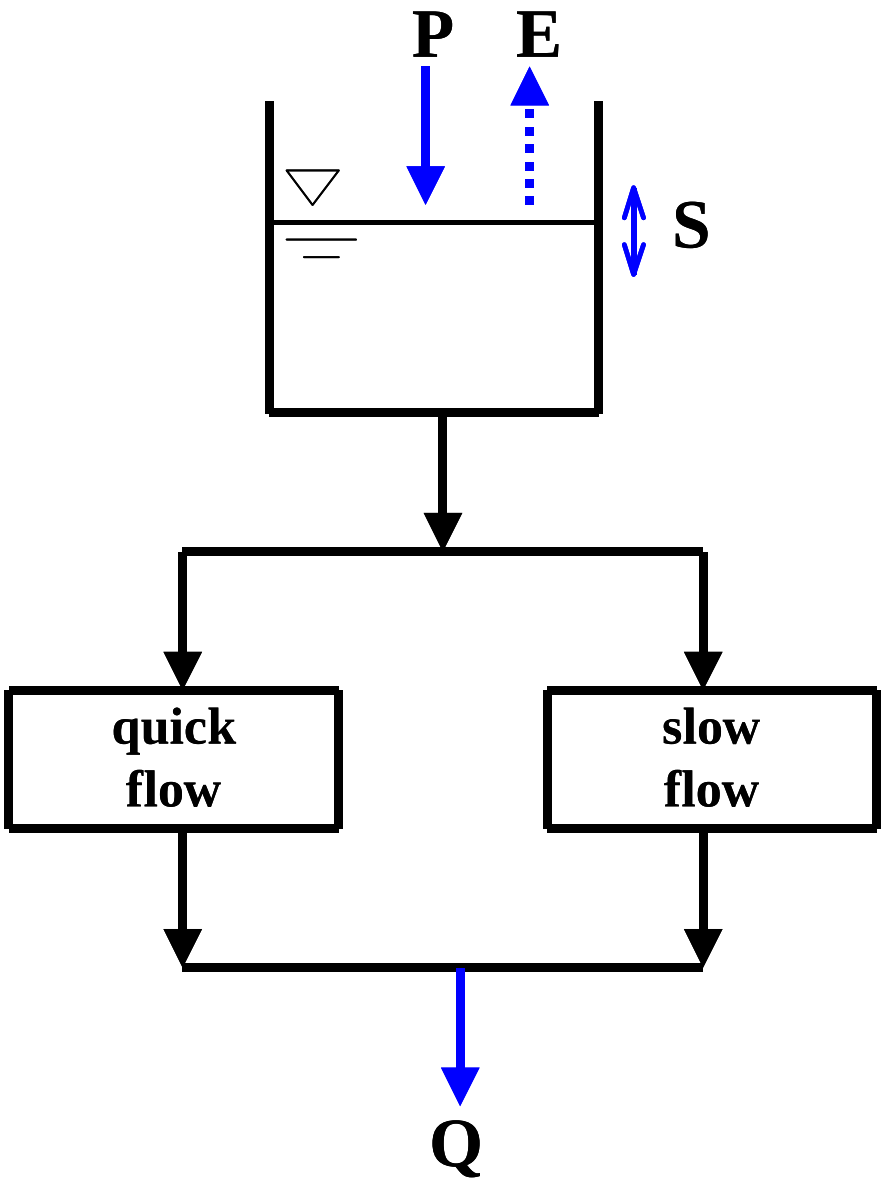
Testing simulation and forecasting models in non-stationary conditions

Applications of IHACRES to workshop-selected catchments exhibiting precipitation-streamflow non-stationarity

Ian Littlewood (UK)

IHACRES – 6 parameters (DRCs)





loss module (non-linear)

Unit Hydrograph module
(non-linear)

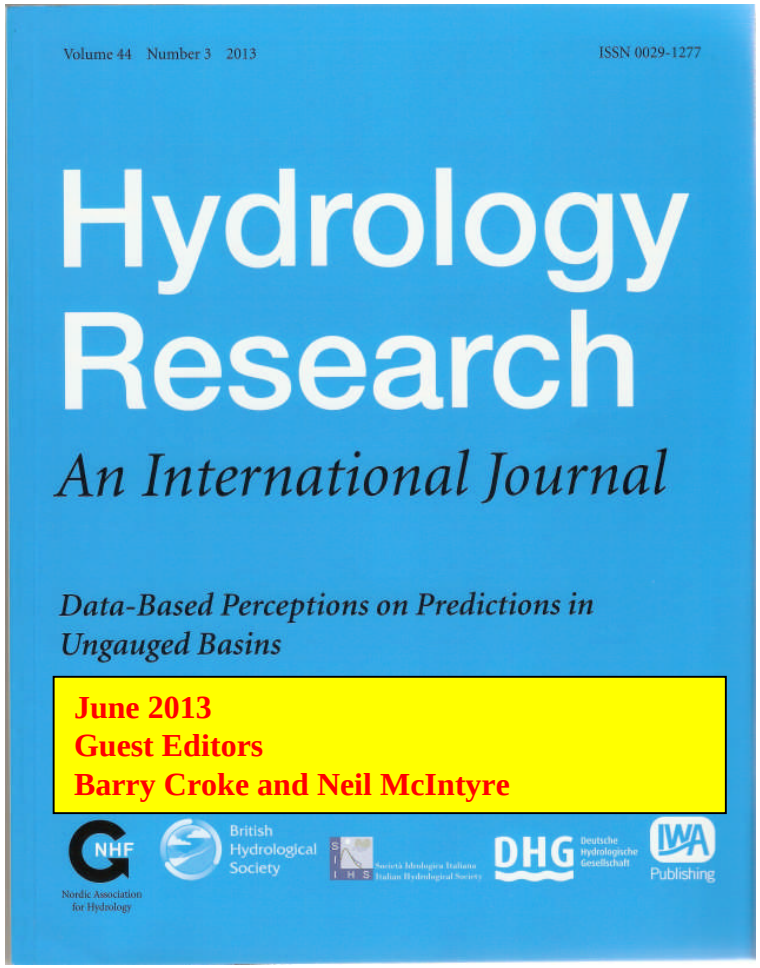
initial notes to self …

Catchment	Area (km^2)				Initial assessment
		L1	L2	L3	
The Fernow River at Watershed 6	0.2				Too small for modelling at daily timestep
The Ruisseau du Rimbaud at Collobrieres	1.4				Too small for modelling at daily timestep
The Ferson Creek at St. Charles	134				Urbanization – might be interesting
The Blackberry Creek at Yorkville	182				Urbanization – might be interesting
The Axe Creek at Longlea	237				Ephemeral – too difficult for 6-parameter IHACRES
The Kamp River at Zwettl	622				Possibly
The Gilbert River at Gilberton	1907				Ephemeral – too difficult for 6-parameter IHACRES – might be interesting to look at events
The Flinders River at Glendower	1912				Ephemeral – too difficult for 6-parameter IHACRES (no T?)
The Wimmera River at Glenorchy Concrete Weir Tail	2000				Ephemeral – too difficult for 6-parameter IHACRES
The Durance River at La Clapiere	2170				Looks good – but glaciers
The Allier River at Vieille-Brioude	2267				Looks good
The Garonne River at Portet-sur-Garonne	9980	•	•		Looks good
The Bani River at Douna	103390	•	•		Looks good – emailed Guillaume 9/3/13

*

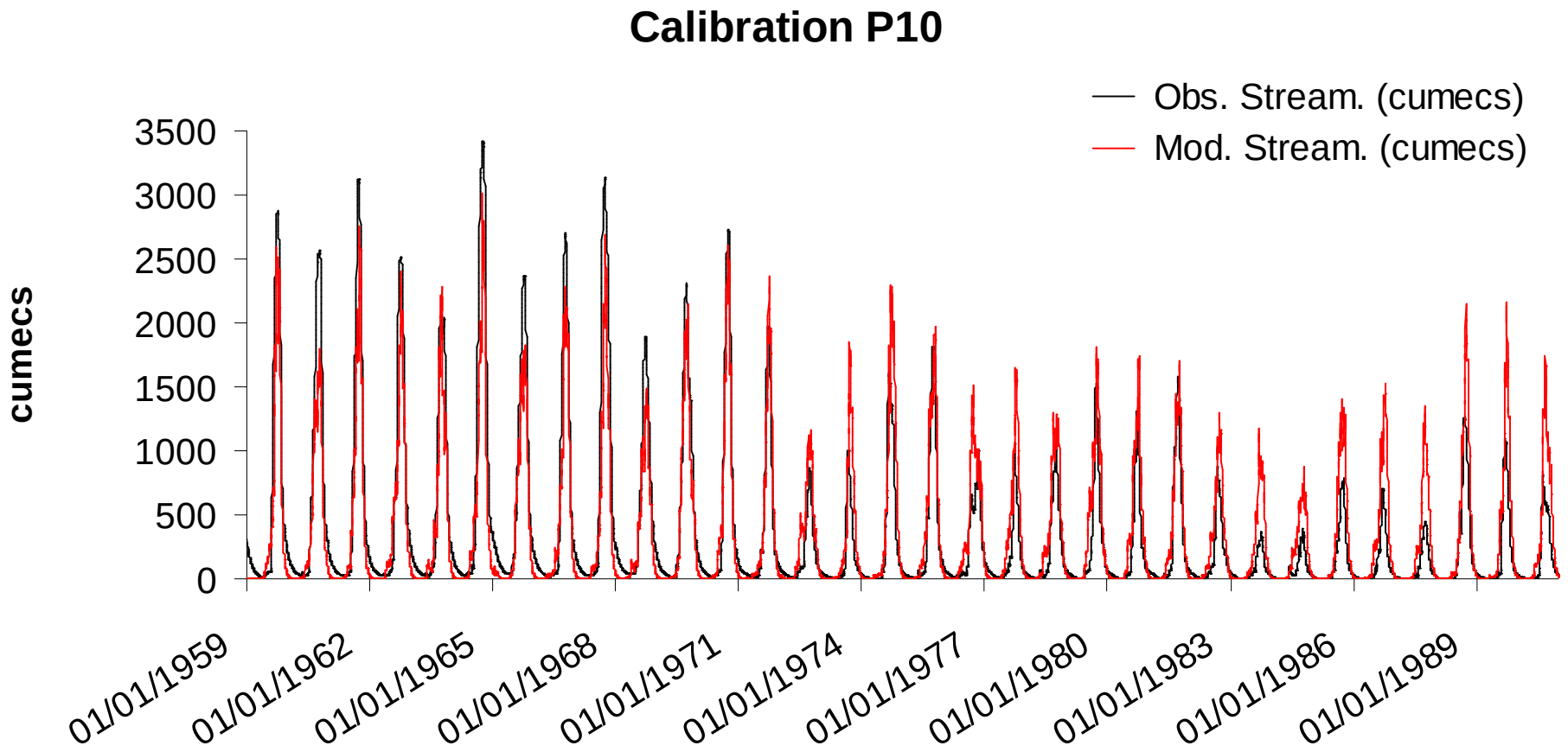
*

Littlewood, I.G. and Croke, B.F.W. (2013). Effects of data time-step on the accuracy of calibrated rainfall–streamflow model parameters: practical aspects of uncertainty reduction. *Hydrology Research.* 44(3), 430-440. doi:10.2166/nh.2012.099.



See also: Littlewood (in press). Regionalisation of rainfall–streamflow models for estimating flows in ungauged basins: towards reducing uncertainty. In (eds): Pomeroy, Spence and Whitfield "Putting PUB into Practice"

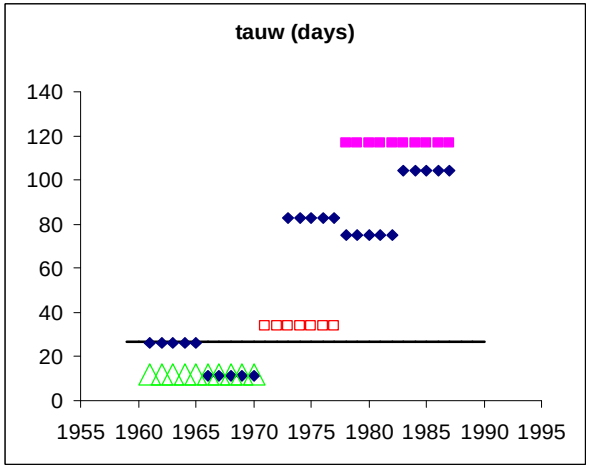
Bani at Douna – calibration 1959-1990 (Level 1)

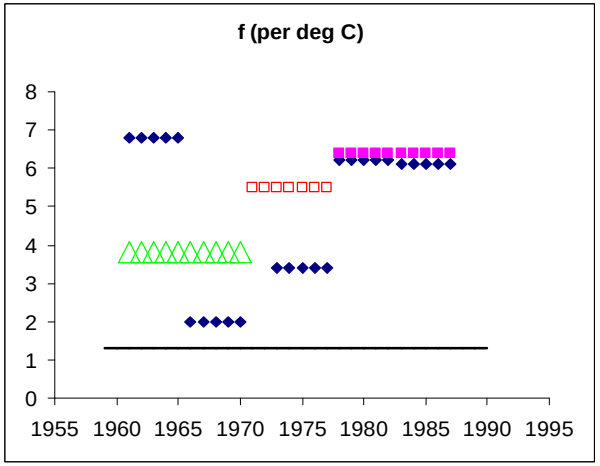


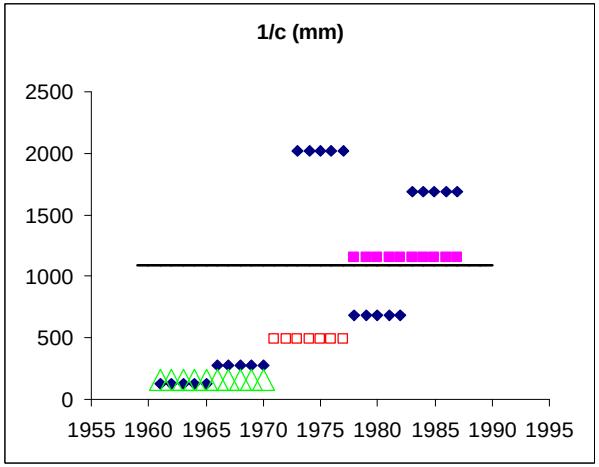
D = 0.798, TD = 30 days, τ_w = 27 days, f = 1.03 $^oC^{-1}$, c = 1090 mm, T = 13.2 days

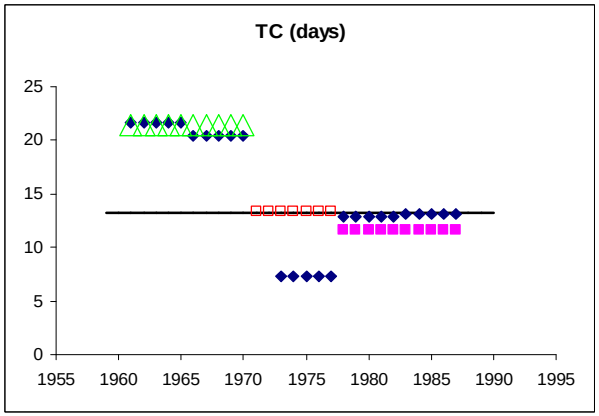
NB – single UH store

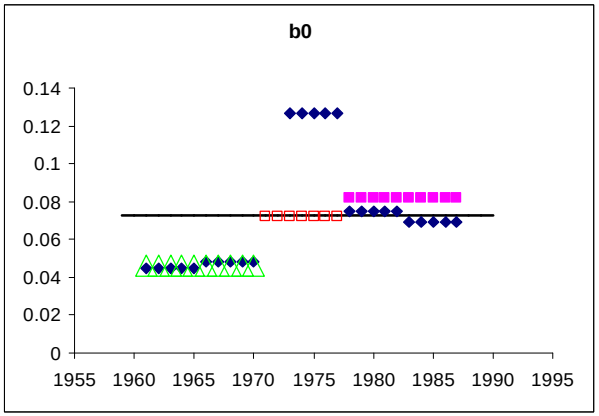
Bani at Douna – calibrations (Level 2 +)

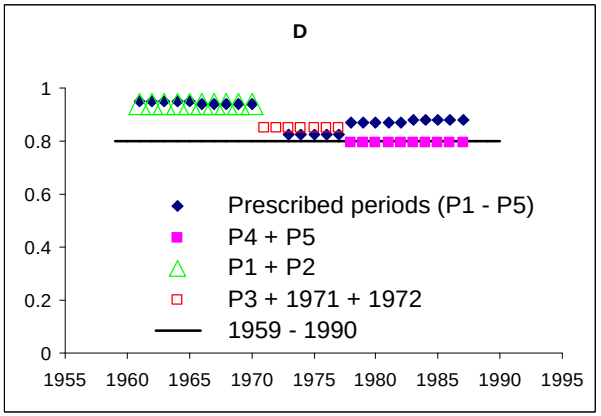




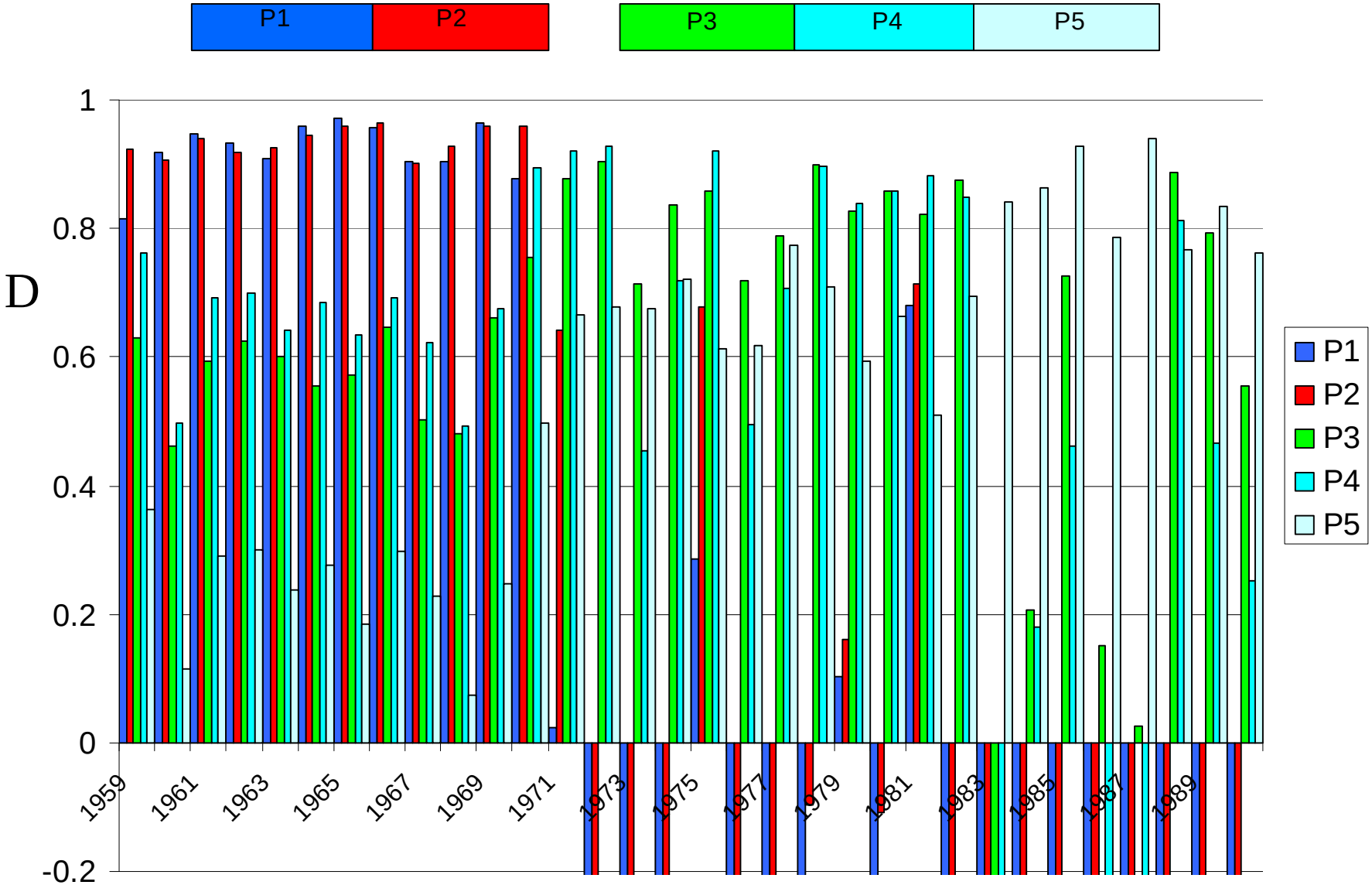




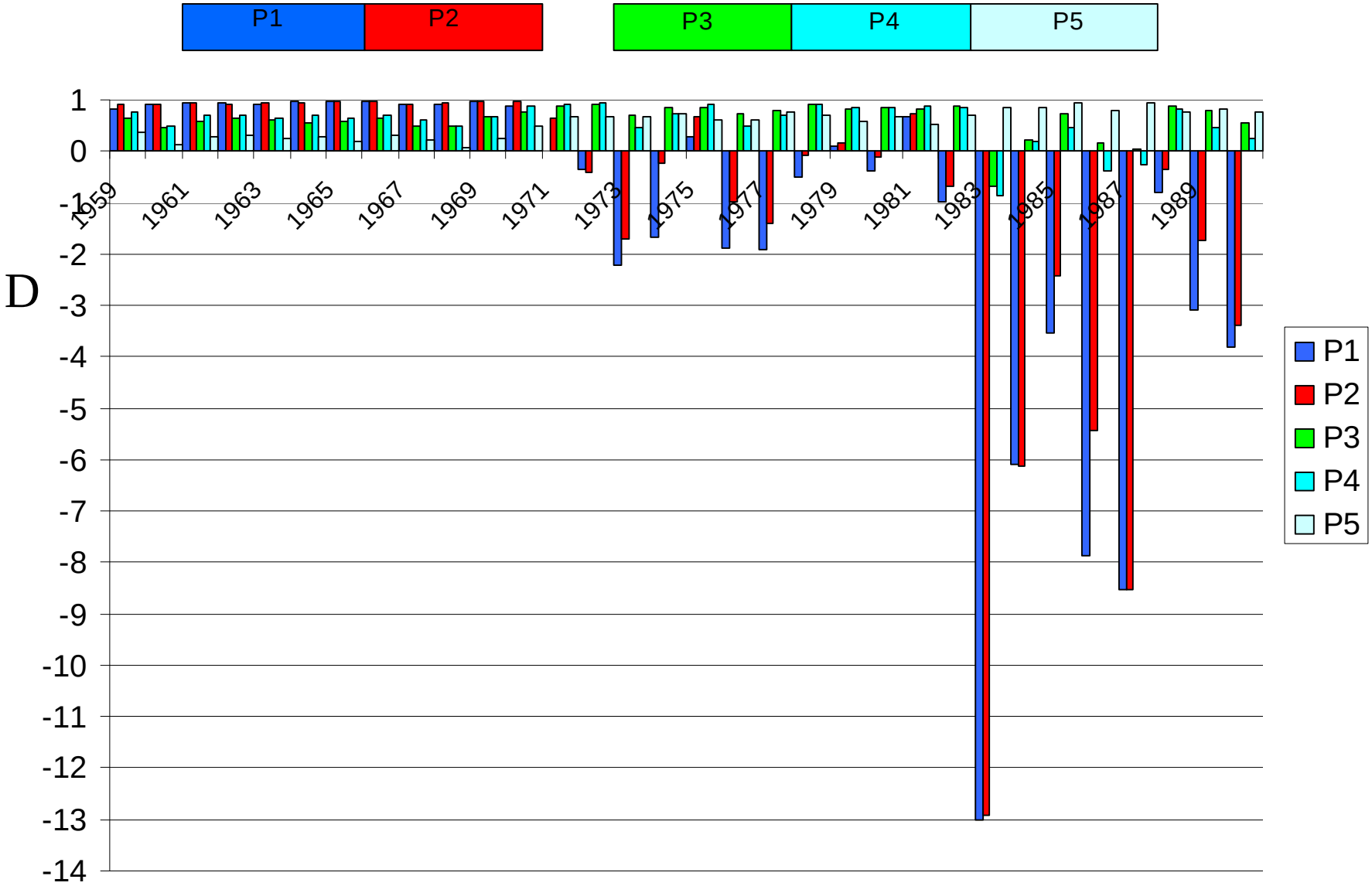




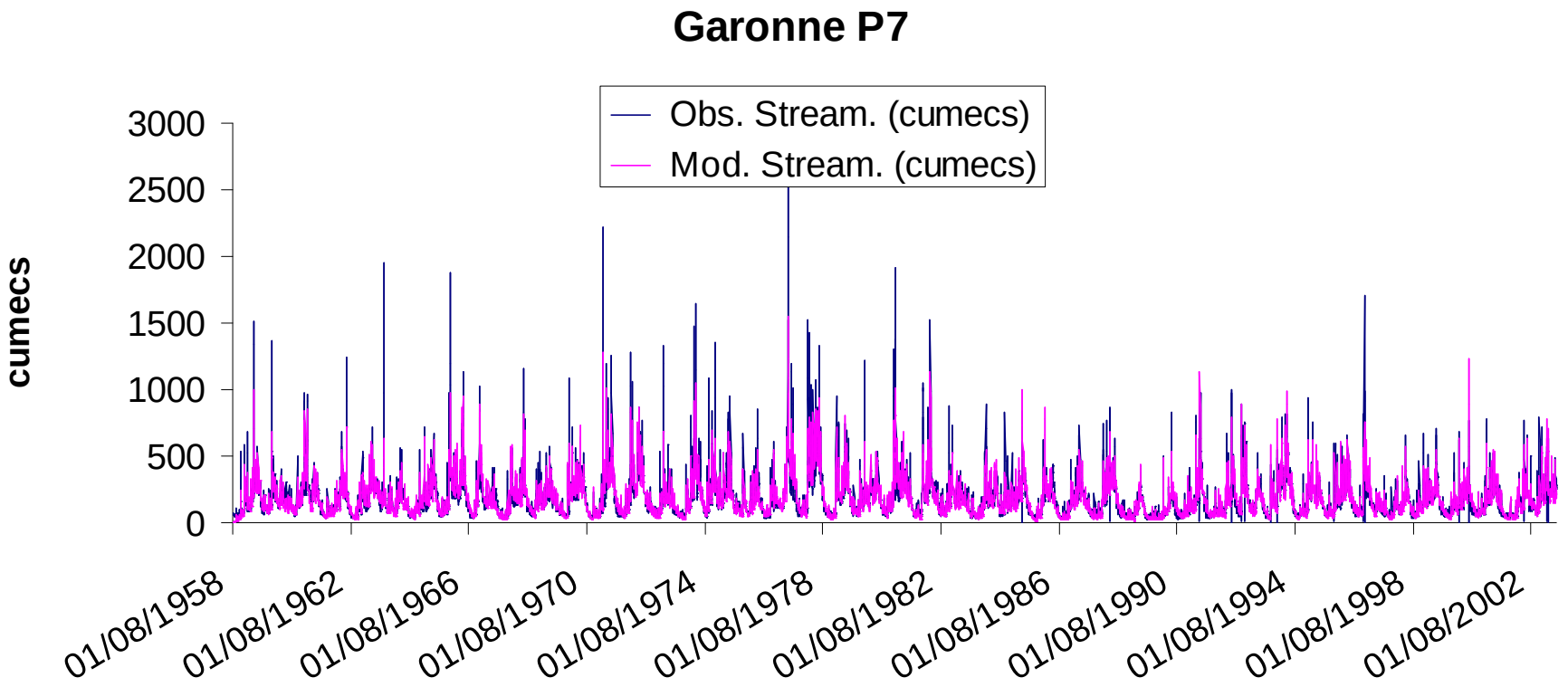
Bani at Douna – simulations (Level 2)



Bani at Douna – calibrations and simulations (Level 2)



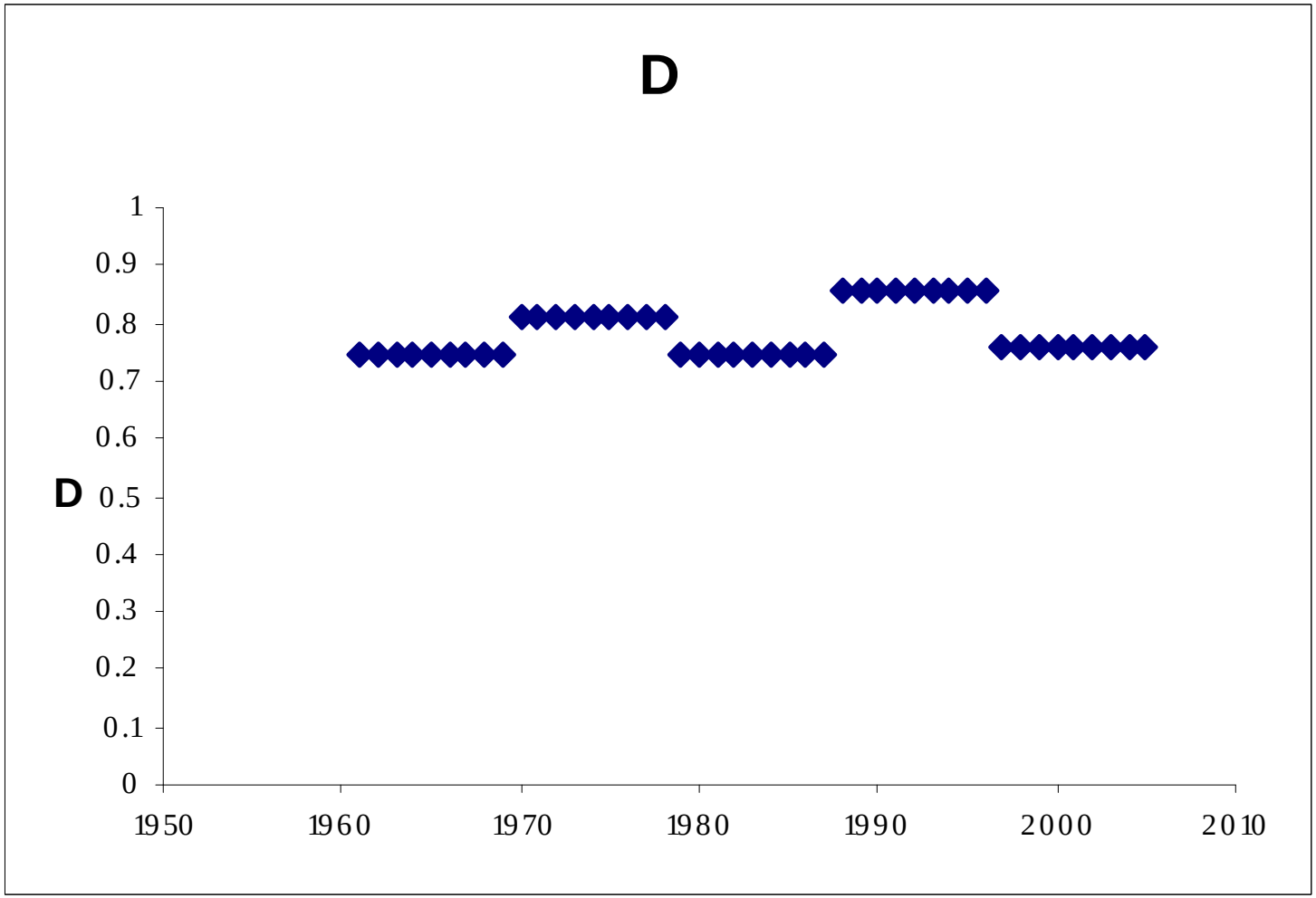
Garonne at Portet-sur-Garonne calibration 1958-2002 (Level 1)



D = 0.794, TD = 1 day, τ_w = 21 days, c = 476mm, f = 1.9 $^oC^{-1}$, $\tau^{(q)}$ = 1.75 days, $\tau^{(s)}$ = 35.8 days

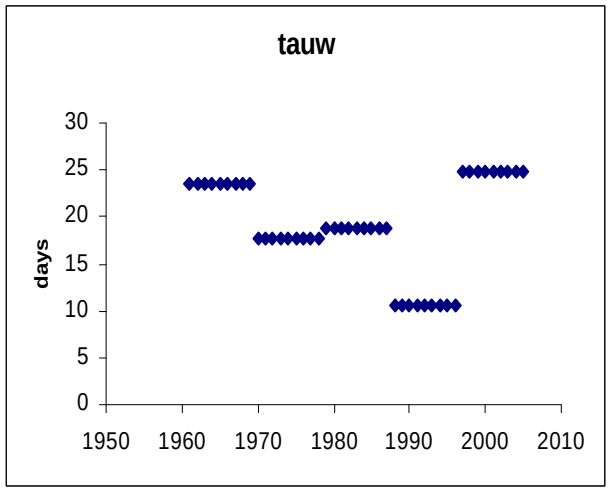
NB – 2 UH stores in parallel

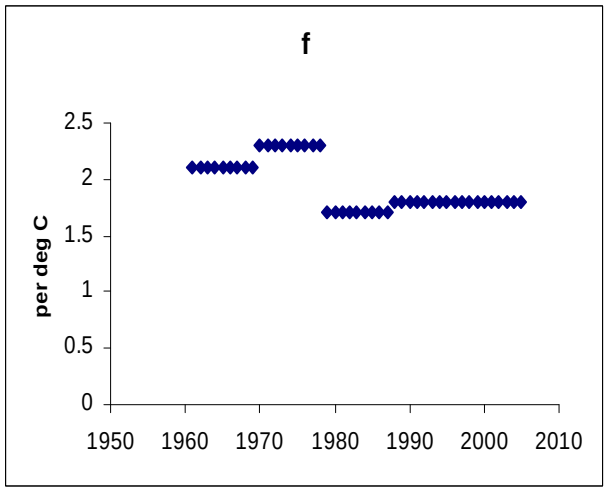
Garonne at Portet-sur-Garonne calibrations (Level 2)

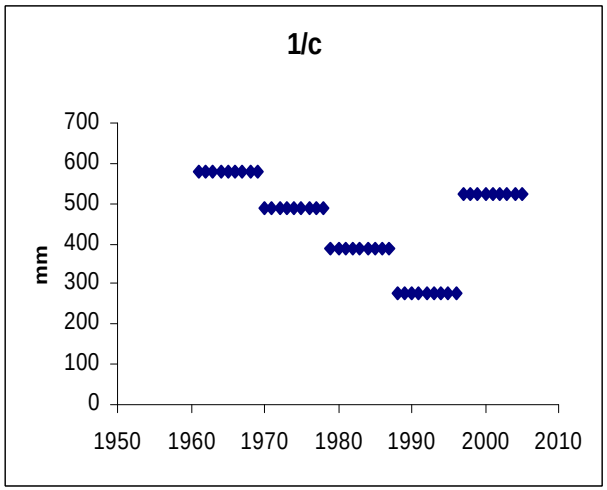


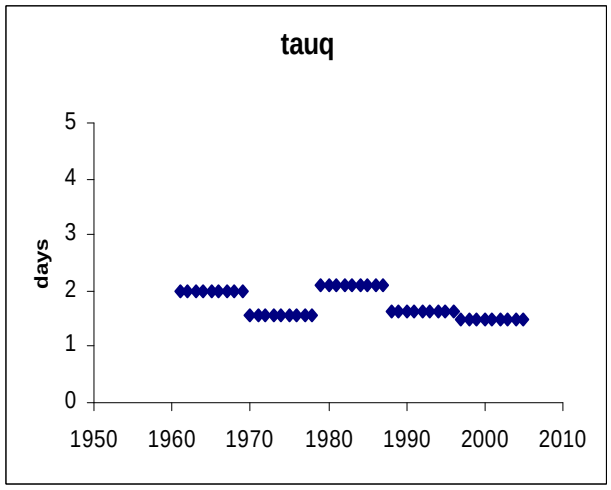
Garonne at Portet-sur-Garonne calibrations (Level 2)

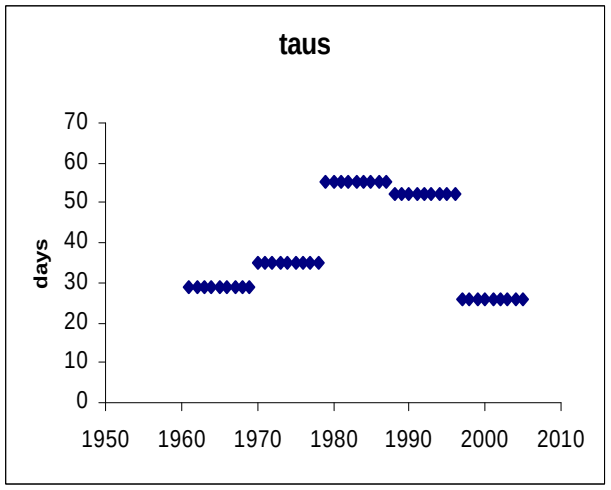
IHACRES dynamic response characteristics (DRCs)

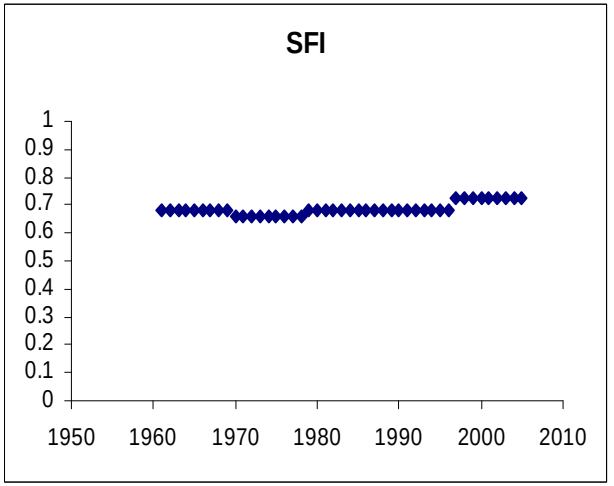








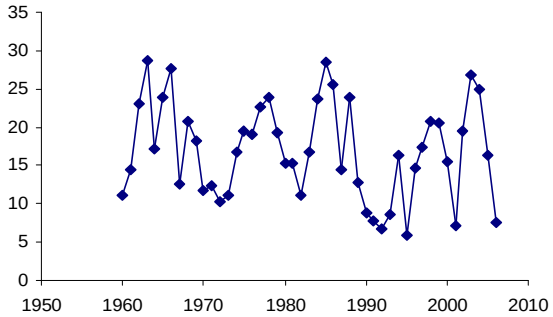




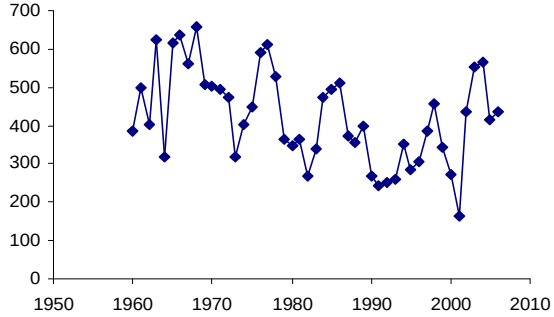
Garonne at Portet-sur-Garonne calibrations (Level 3)

calibrations for 3-year overlapping periods

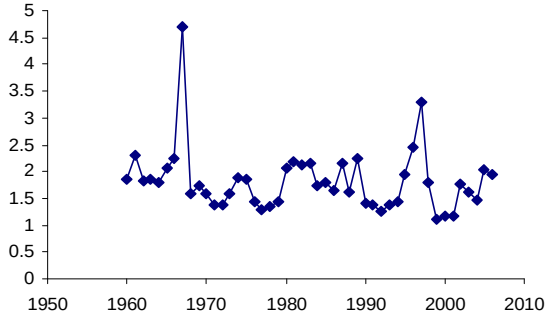
tauw (days)



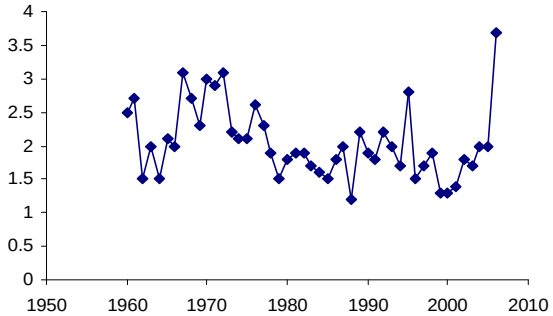
1/c (mm)



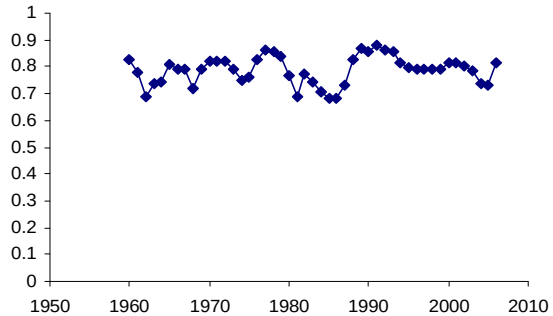
tauq (days)



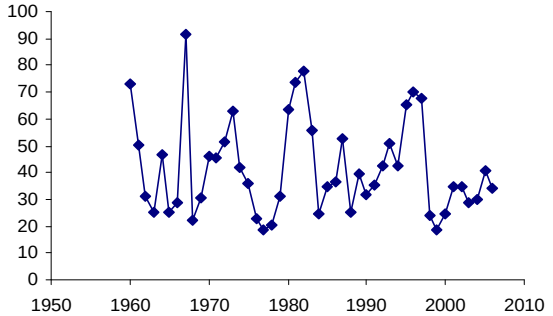
f (per deg C)



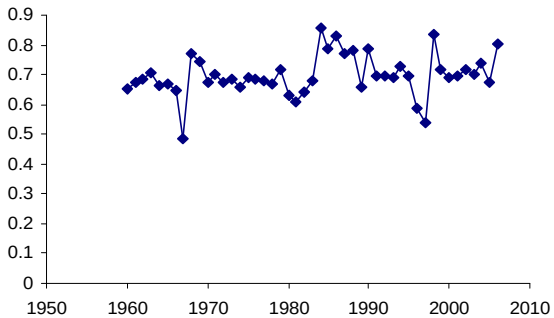
D



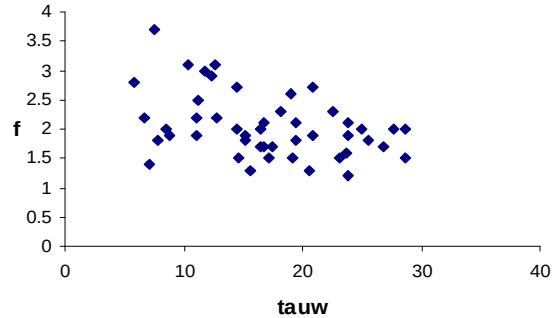
taus (days)



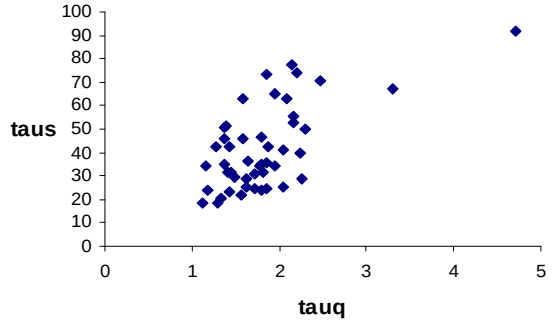
SFI



tauw - f



tauq - taus



Thank you