

SIC4DVar results on Pepsi 2 challenge

Hind Oubanas, Igor Gejadze, Felix Billaud, Pierre-Olivier Malaterre

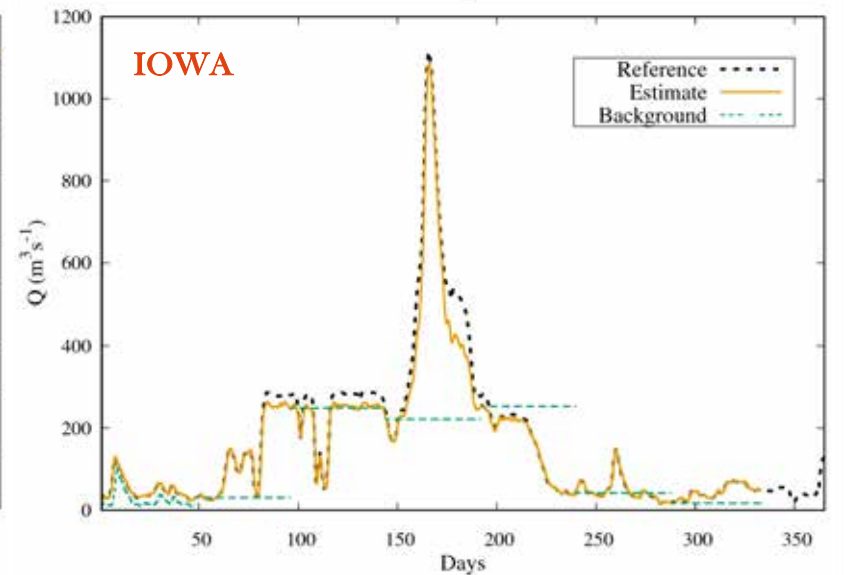
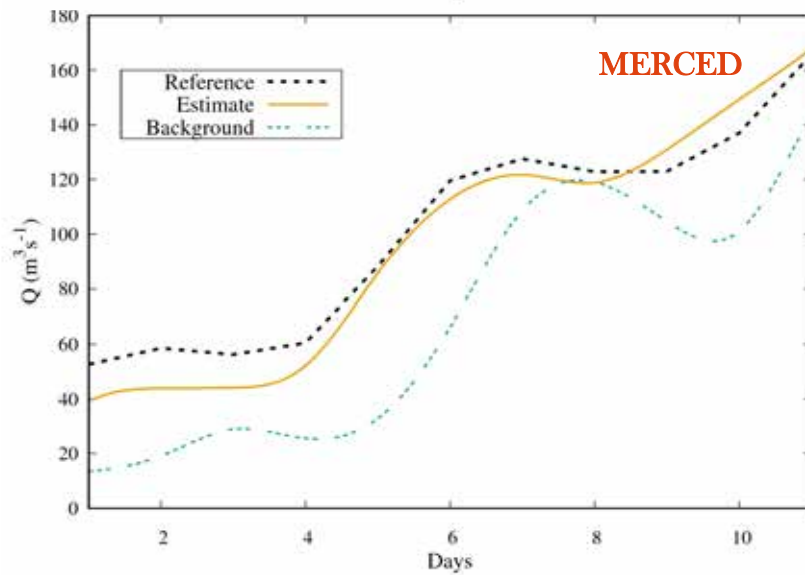
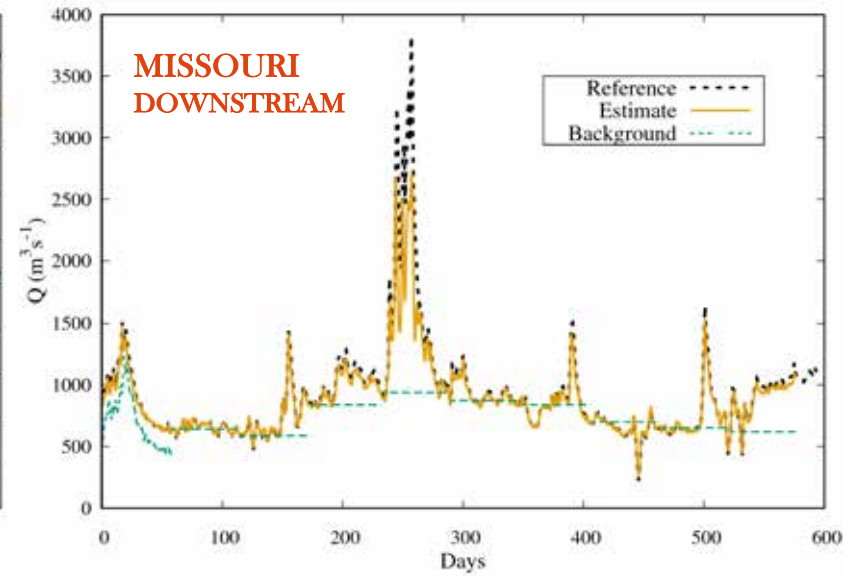
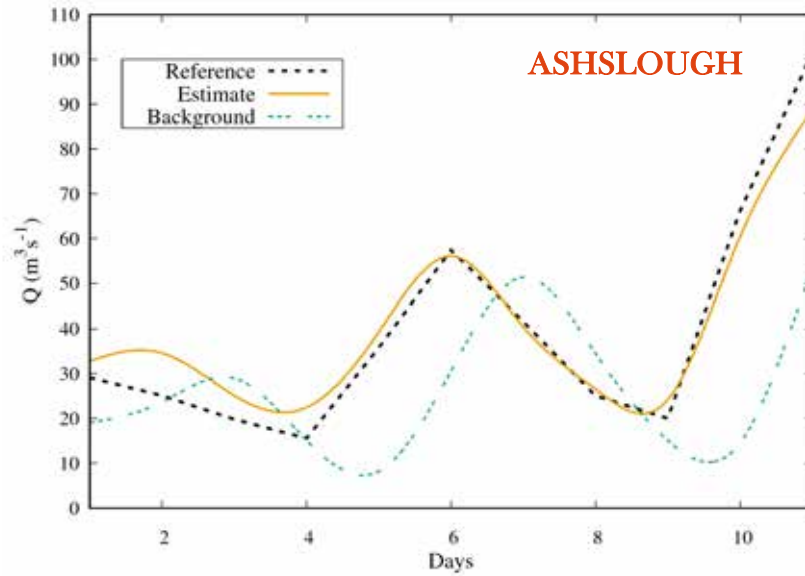
PEPSI CHALLENGE 2

PRELIMINARY RESULTS

- All following results are obtained:
 - using the **same generic set up**, no ad-hoc selection / optimisation
 - with **noisy** observations ($\sigma = [.05 \ 5 \ 0.1e - 5]$).
 - with data only at the **reach level**.
 - with only **SWOT data** (elevation, width, water slopes) & Q_{WBM} .
- New results to come ...
 - still some developments under process.
 - better generation of priors.
 - better management of drops.
 - integration of “bad” reaches.
 - better management of tidal effects.
 - working at the node level instead at the reach level
 - many alternative options to evaluate...

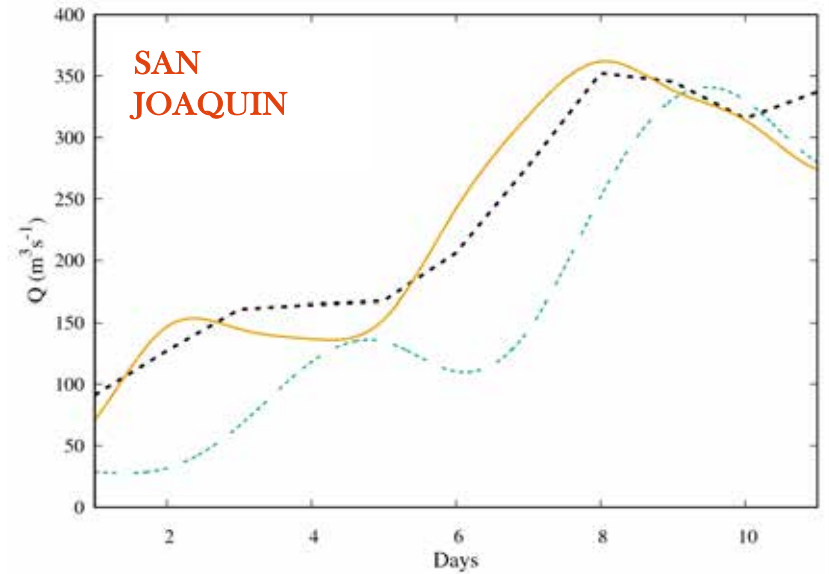
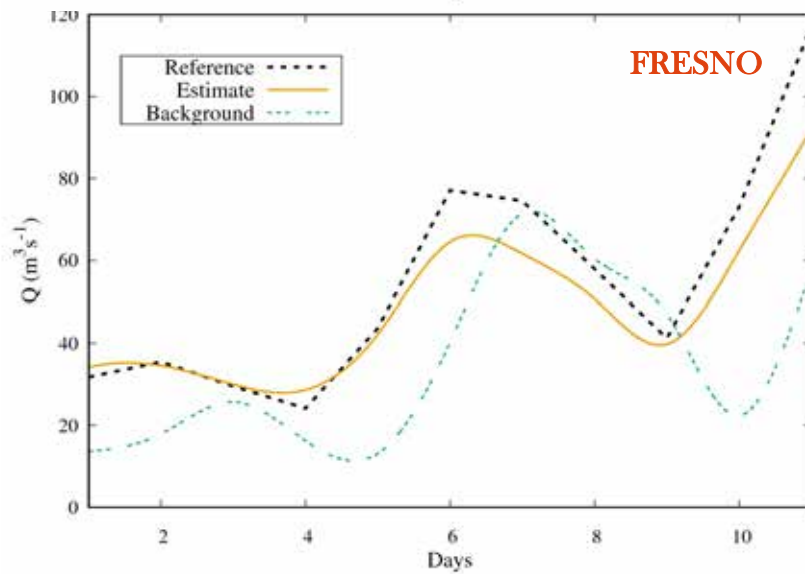
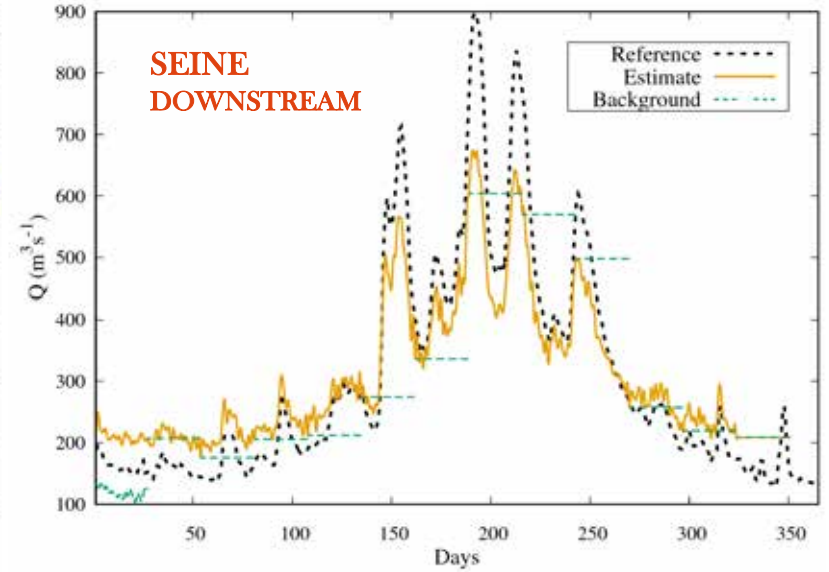
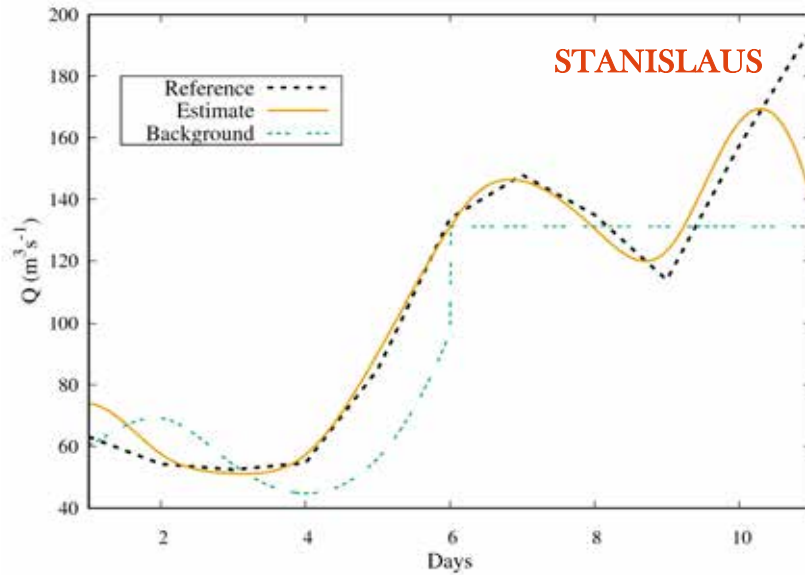
RIVER DISCHARGE ESTIMATION

PEPSI CHALLENGE 2 : PRELIMINARY RESULTS



RIVER DISCHARGE ESTIMATION

PEPSI CHALLENGE 2 : PRELIMINARY RESULTS



RIVER DISCHARGE ESTIMATION

PEPSI CHALLENGE 2 TEST CASES

	RMSE ($m^3 s^{-1}$)	rRMSE (%)	NRMSE (%)	NSE	VE
- Manning's Prior					
- Posterior					
ASHSLOUGH	9.39	25.1	24.5	0.84	0.79
	4.95	22.06	15.19	0.89	0.86
FRESNO	14.10	32.2	26.9	0.73	0.75
	6.94	11.80	14.94	0.87	0.88
IOWA	177.34	48.4	112.1	0.056	0.606
	27.76	8.29	16.40	0.97	0.91
MERCED	22.52	38.4	23.4	0.672	0.793
	13.28	26.50	14.78	0.85	0.87
MISSOURI DOWNSTREAM	413.16	41.4	44.7	0.012	0.615
	169.82	6.87	17.44	0.86	0.93
SAN JOAQUIN	44.04	34.3	20.1	0.795	0.813
	23.781	17.65	11.43	0.93	0.90
SEINE DOWNSTREAM	159.11	37.9	52.9	0.224	0.587
	69.49	21.58	21.70	0.85	0.83
STANISLAUS	49.10	31.5	47.1	-0.08	0.669
	9.86	16.55	13.76	0.87	0.90

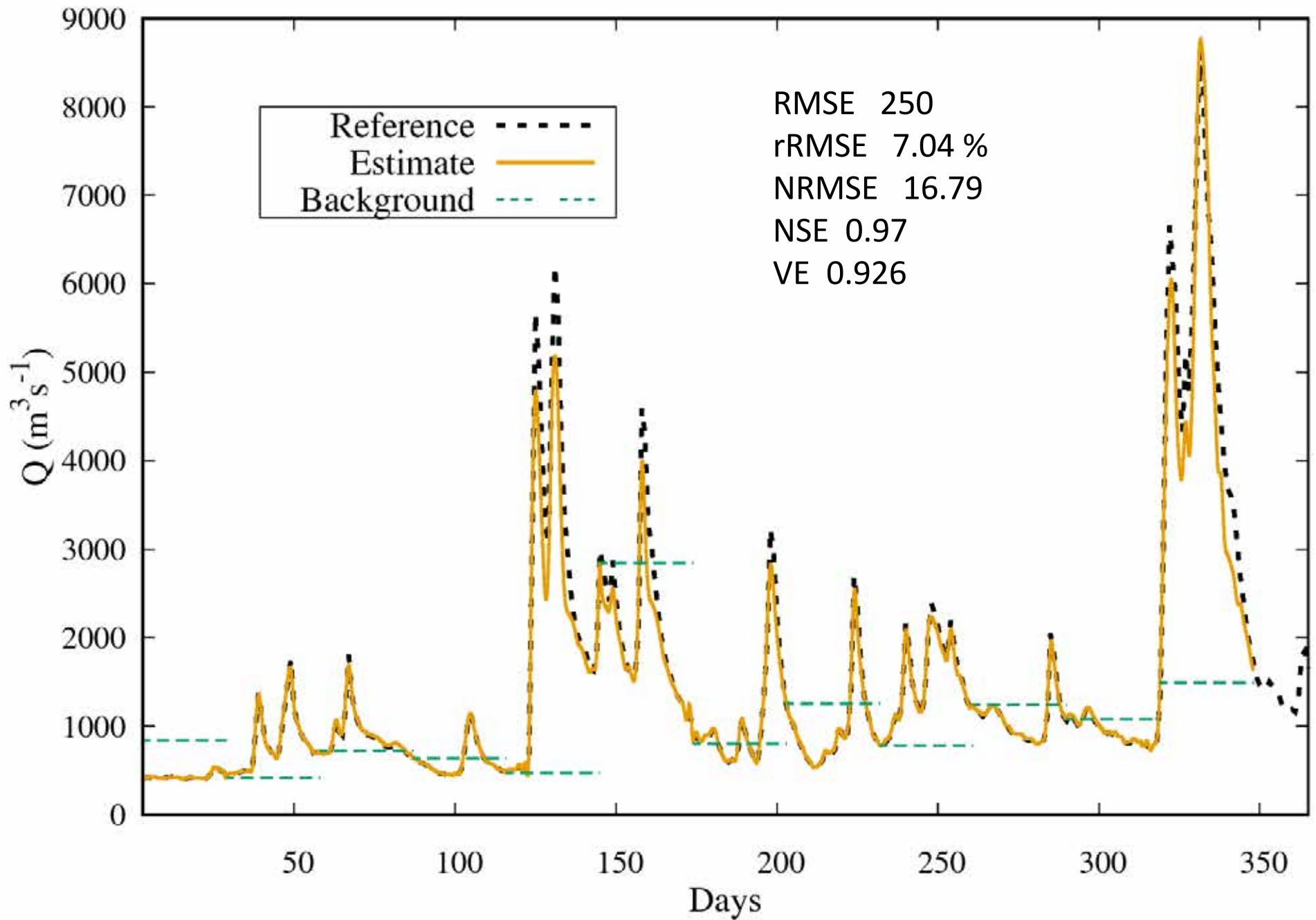
RIVER DISCHARGE ESTIMATION

PEPSI CHALLENGE 2 TEST CASES

- METROMAN HYDRAULIC DEPTH / STAGE (without noise)
- SIC4DVAR (with noise)

	RMSE ($m^3 s^{-1}$)	rRMSE (%)		NRMSE (%)		NSE		VE
ASHSLOUGH	4.95	22.06	45	15.19	35	0.89	0.85	0.86
			40		32		0.88	
FRESNO	6.94	11.80	53	14.94	49	0.87	0.11	0.88
			45		42		0.35	
IOWA	27.76	8.29	29	16.40	63	0.97	0.70	0.91
			48		82		0.49	
MERCED	13.28	26.50	15	14.78	16	0.85	0.85	0.87
			32		19		0.78	
MISSOURI DOWNSTREAM	169.82	6.87	18	17.44	28	0.86	0.61	0.93
			22		30		0.55	
SAN JOAQUIN	23.781	17.65	49	11.43	27	0.93	0.45	0.90
			45		15			
SEINE DOWNSTREAM	69.49	21.58	37	21.70	40	0.85	0.55	0.83
			45		46		0.40	
STANISLAUS	9.86	16.55	20	13.76	12	0.87	0.93	0.90
			17		23		0.72	

PO (Pepsi 1)



A microscopic image showing numerous nematodes, likely parasitic, against a dark blue background. The worms are thin, thread-like, and exhibit a characteristic wavy, serpentine movement. Some are more prominent and brightly lit, while others are fainter and more numerous in the background.

MERCI !

THANK YOU !

Many thanks to TOSCA CNES, CLS, Irstea, AFD funds