Alboran Sea	*Winter*	*Spring*	*Summer*	*Autumn*	*Total*	χ^2
1945-1972	26 (25,3)	27 (25,8)	25 (25,3)	23 (24,8)	101	0,04
1973-2000	24 (24,8)	24 (25,3)	25 (24,8)	26 (24,3)	99	
1945-2000	50	51	50	49	200	0,42

Algerian basin	*Winter*	*Spring*	*Summer*	*Autumn*	*Total*	χ^2
1945-1972	25 (24,8)	26 (24,8)	26 (28,0)	25 (24,3)	102	0,64
1973-2000	22 (22,2)	21 (22,2)	27 (25,0)	21 (21,7)	91	
1945-2000	47	47	53	46	193	0,47

Ligurian Sea	*Winter*	*Spring*	*Summer*	*Autumn*	*Total*	χ^2
1945-1972	24 (24,9)	24 (23,9)	26 (25,9)	26 (25,4)	100	0,17
1973-2000	27 (26,1)	25 (25,1)	27 (27,2)	26 (26,6)	95	
1945-2000	51	49	53	52	205	0,09

Tyrrhenian Sea	*Winter*	*Spring*	*Summer*	*Autumn*	*Total*	χ^2
1945-1972	26 (26,4)	27 (26,4)	26 (27,4)	26 (24,8)	105	0,25
1973-2000	25 (24,6)	24 (24,6)	27 (25,6)	22 (23,2)	98	
1945-2000	51	51	53	48	203	0,31

Table TS1. Contingency tables for Chi-2 tests for the Alboran Sea, Algerian basin, Ligurian Sea and Tyrrhenian Sea. The fourth row is the number of seasonal data for the surface layer temperature corresponding to each season of the year for the complete period of time (1945-2000, columns 2 to 4), the total number of data (column 5) and the Chi-2 value (column 6). The Chi-2 value is calculated as the square of the difference between the observed and the theoretical observations divided by the theoretical frequency. If all the seasons had the same probability of being sampled the theoretical frequency would be ¼ of the total number of observations (column 6). The second and third rows show the frequency of observations and the theoretical number in parenthesis for the first and second halves of the time series. The theoretical number considers that the different seasons have the same probability of being sampled in both periods of time. Chi-2 values are compared with the critic value for 3 degrees of freedom: 7.82

Levantine basin	*Winter*	*Spring*	*Summer*	*Autumn*	*Total*	χ^2
1945-1972	24 (24,7)	26 (25,8)	27 (26,3)	26 (26,3)	103	0,12
1973-2000	25 (24,3)	25 (25,3)	25 (25,8)	26 (25,8)	101	
1945-2000	49	51	52	52	204	0,10

Adriatic Sea	*Winter*	*Spring*	*Summer*	*Autumn*	*Total*	χ^2
1945-1972	25 (25,4)	26 (26,4)	26 (25,4)	25 (24,9)	102	0,10
1973-2000	24 (23,6)	25 (24,6)	23 (23,6)	23 (23,2)	95	
1945-2000	49	51	49	48	197	0,06

Table TS2. The same as in table TS1 but for the surface layer of the Levantine basin and the Adriatic Sea.

EN4 data. Potential temperatura and salinity trends. ºC/100 yr, psu/100 yr.				
	θ-AW	S-AW	θ-MW	S-MW
WMED	1.30 ± 0.30	0.03 ± 0.03	0.20 ± 0.04	0.09 ± 0.01
EMED	1.20 ± 0.30	0.04 ± 0.03	0.18 ± 0.05	0.08 ± 0.01
MED	1.30 ± 0.30	0.04 ± 0.04	0.19 ± 0.04	0.09 ± 0.01

Table TS3. Potential temperature and salinity linear trends for the AW and MW for the WMED, EMED and MED using the EN4 reanalysis product.

	E	P	R	BS	E_N
Nielsen (1912)	5194	1335	900		
Sverdrup (1942)	3639	997	230	205	
Defant (1961)				205	
Tixeront (1970)	2996	884	513	189	
Lacombe & Tchernia (1972a)	3327	884	513	189	
Ovchinnikov (1974)			429		
Nof (1979)					2208[a]
Bethoux (1979,1980)				205	2500[a]
Lacombe et al. (1981)				200	
Ozsoy & Ünlüata (1997)				300	
Boukthir & Barnier (2000)	2300	825	347		
Struglia et al. (2004)			255-328		
Ludwig et al. (2009)			440-737[b] 328-387[c]		
Criado-Aldeanueva et al. (2012)	2965	1173-1265	328		
Valores medios	3404	1080	442	213	2126[d]

Table TS4. Evaporation (E), precipitation (P), river discharges (R), Net flow from the Black Sea (BS) and net evaporation (E_N =E-P-R-BS) according to different authors.

a. Values estimated from the volume, salt and heat balance including the Black Sea net flow.

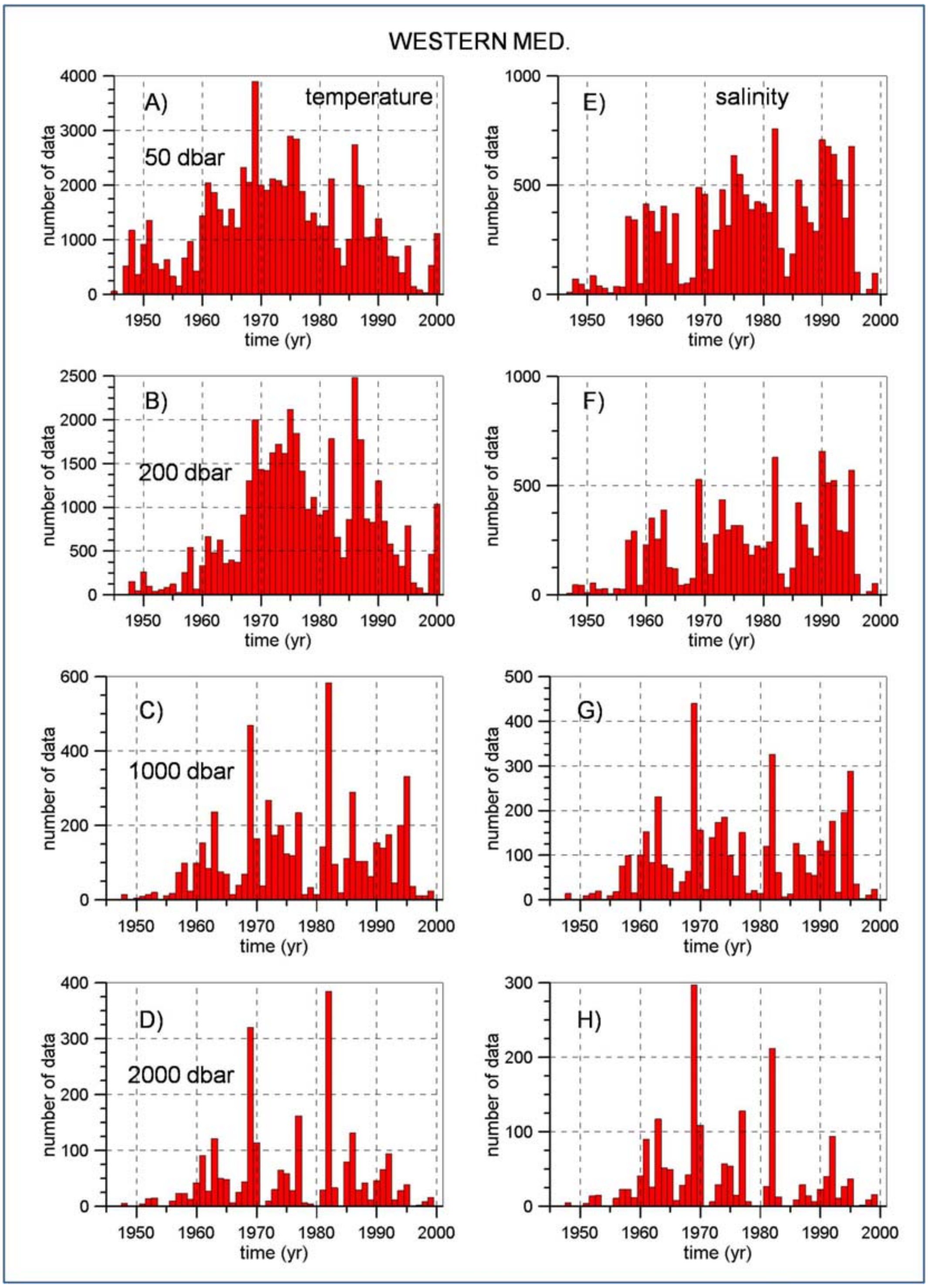
b. Minimum and maximum values from the literature review.

c. Values estimated by Struglia et al. (2004) for two different periods..

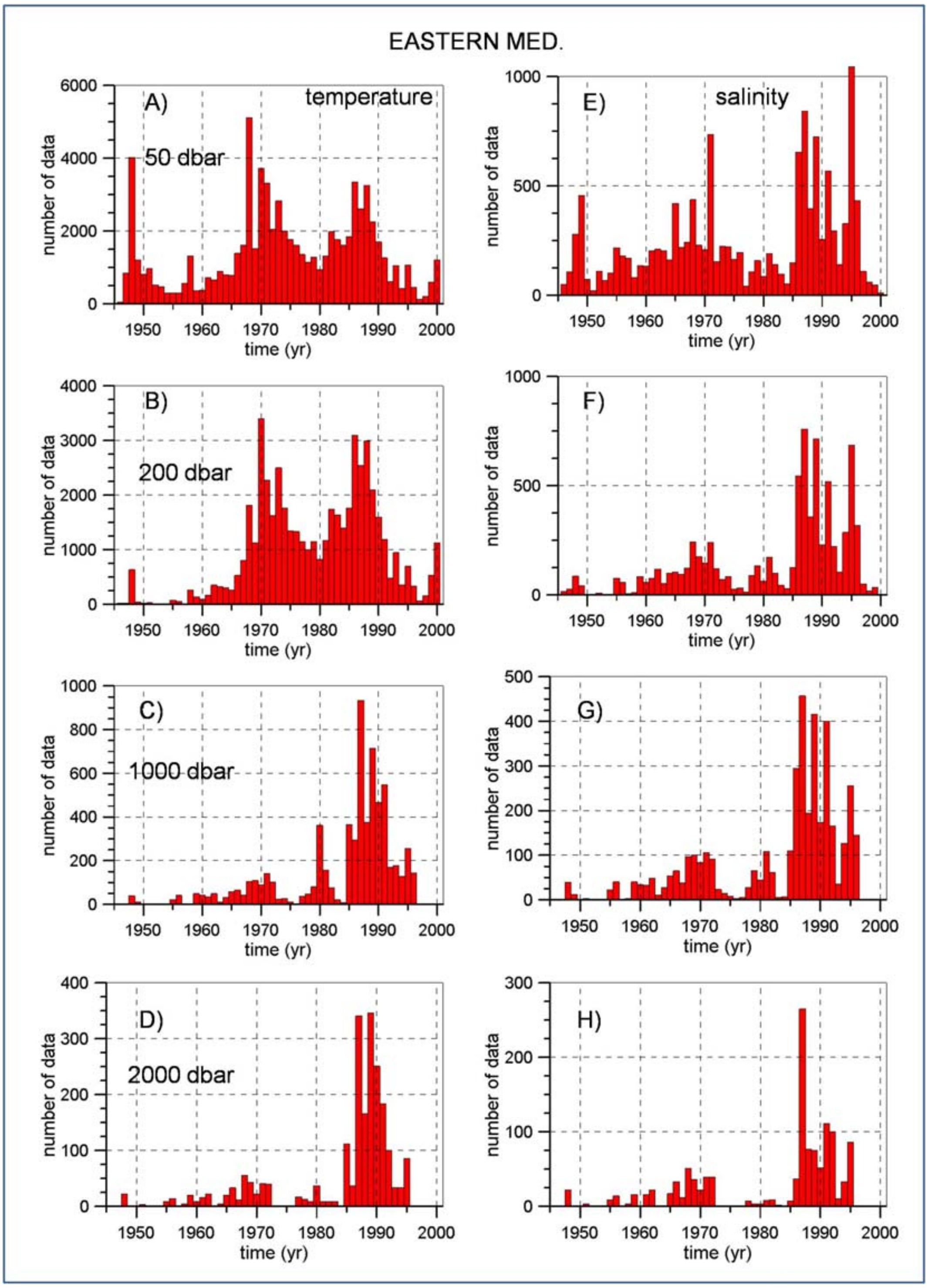
d. Mean values for E, P, R and BS which are used for the estimation of E-P-R-BS. This final value is averaged with those estimated by Bethoux and Nof.

	ΔR Nilo	ΔR Ebro
Rohling & Bryden (1992)	90-0 = 90	
Bethoux & Gentili (1996)	64-4 = 58	
Bethoux et al. (1998)		32
Krahmann & Schott (1998)		12
Boukthir & Barnier (2000) **Citan a Wadie, 1984**	58	30
Skliris & Lascaratos (2004)	85 (90 %) = 77	
Ludwig et al. (2009)	83-15 = 68	
Skliris et al. (2012)	85-5 = 80	
Valores medios	75	25

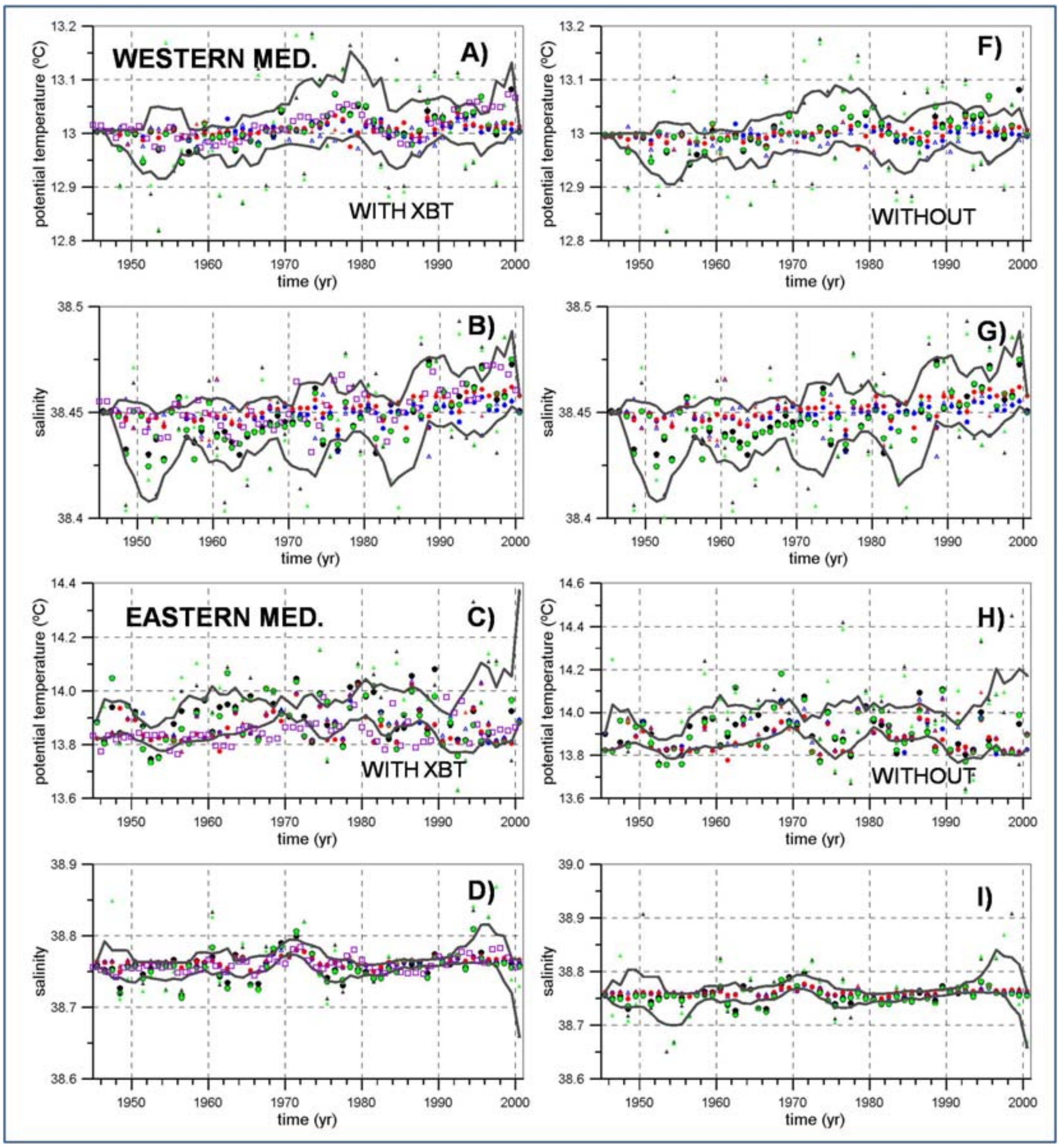
Table TS5. Estimation for the changes in river discharges caused by the damming of the river Nilo and Ebro.



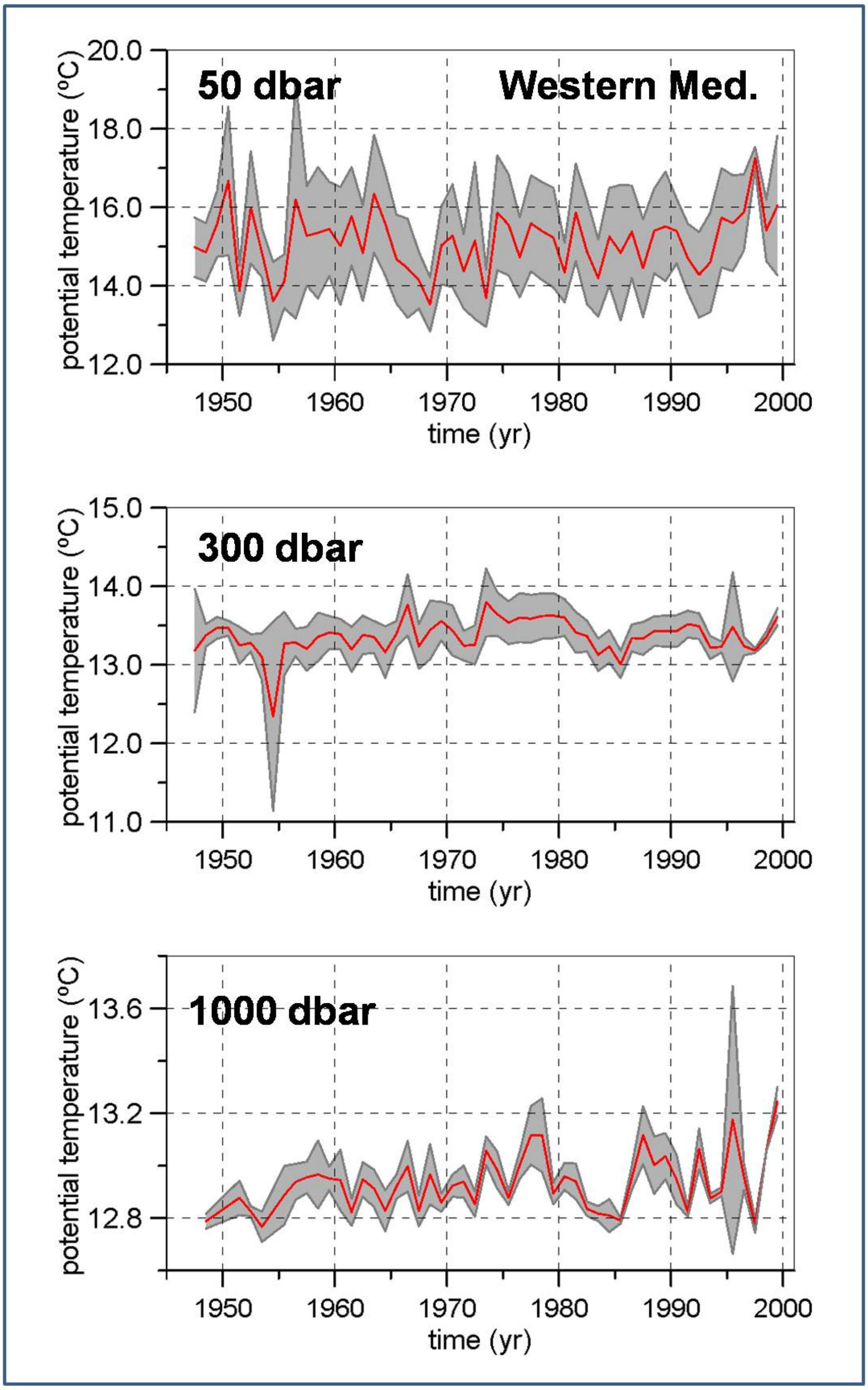
S1. Number of annual data for the WMED and EMED at different pressure levels representing the upper, intermediate and deep layers.



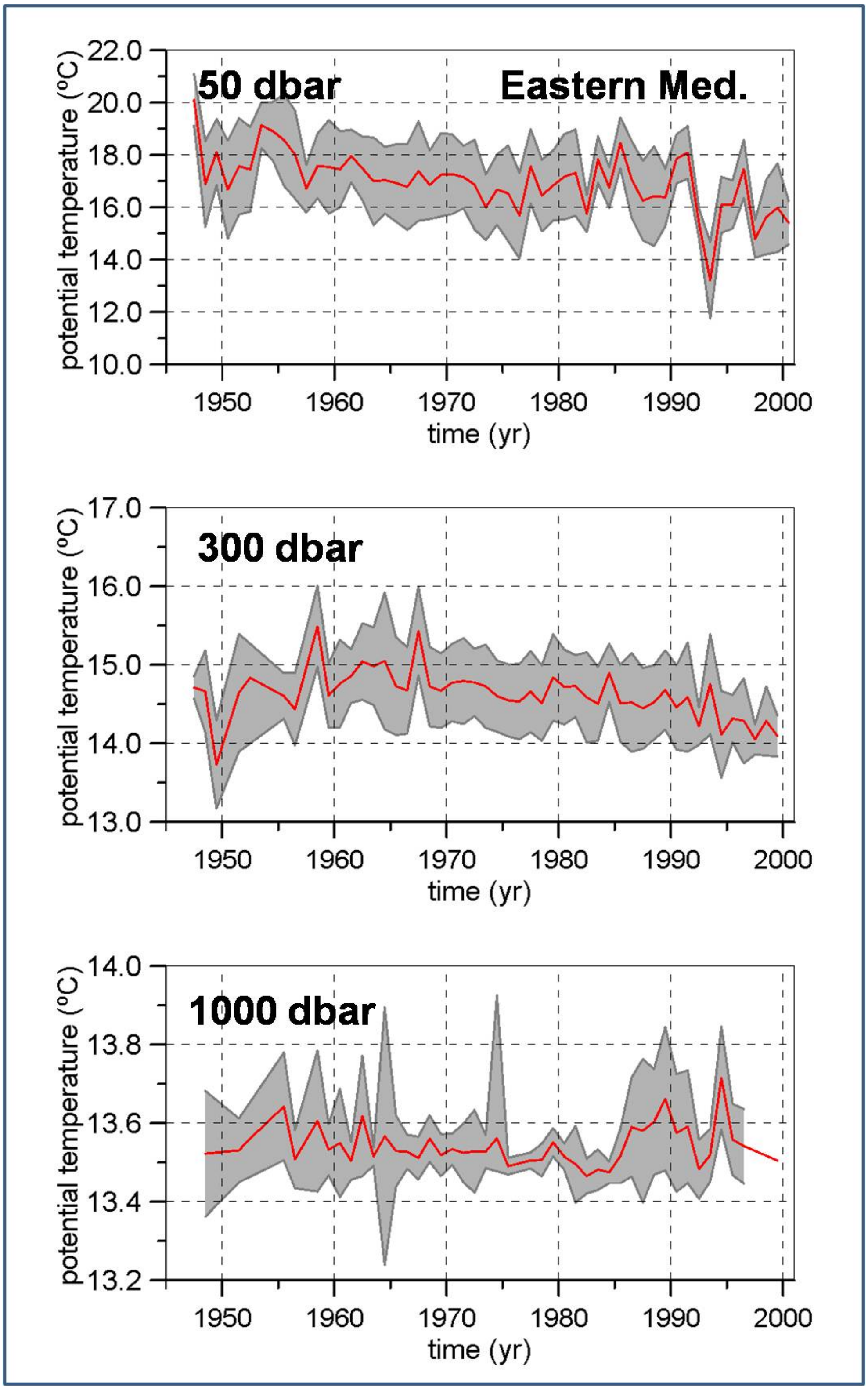
S2. As in figure S1, but for the EMED.



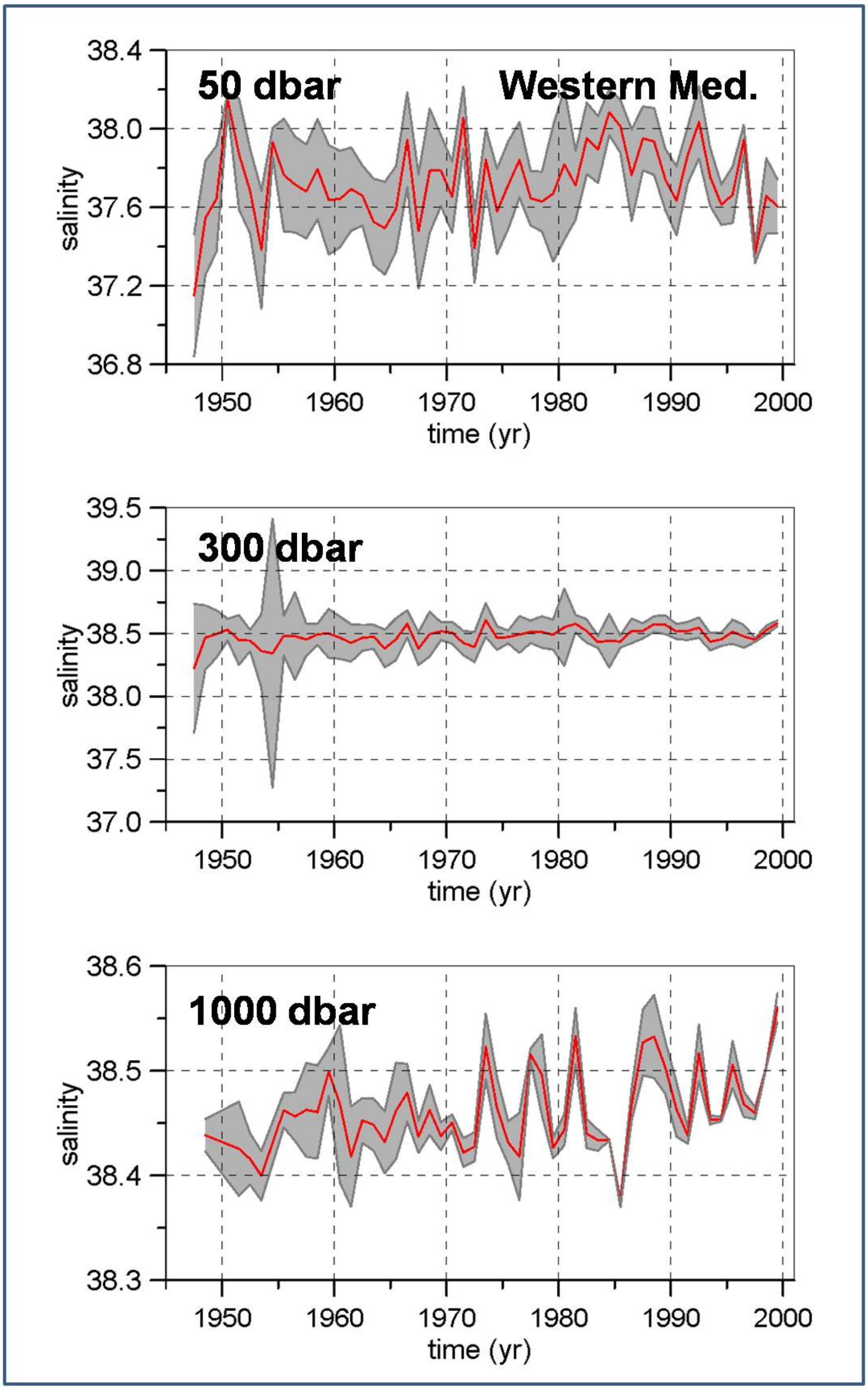
S3. Colored symbols are the different time series constructed for the potential temperature and salinity of MW in the WMED and EMED with and without the inclusion of XBT data. Grey lines are time series constructed using the maximum and minimum value for each year. Values from some years are out these limits because the minimum-maximum time series have been smoothed with a five year moving average.



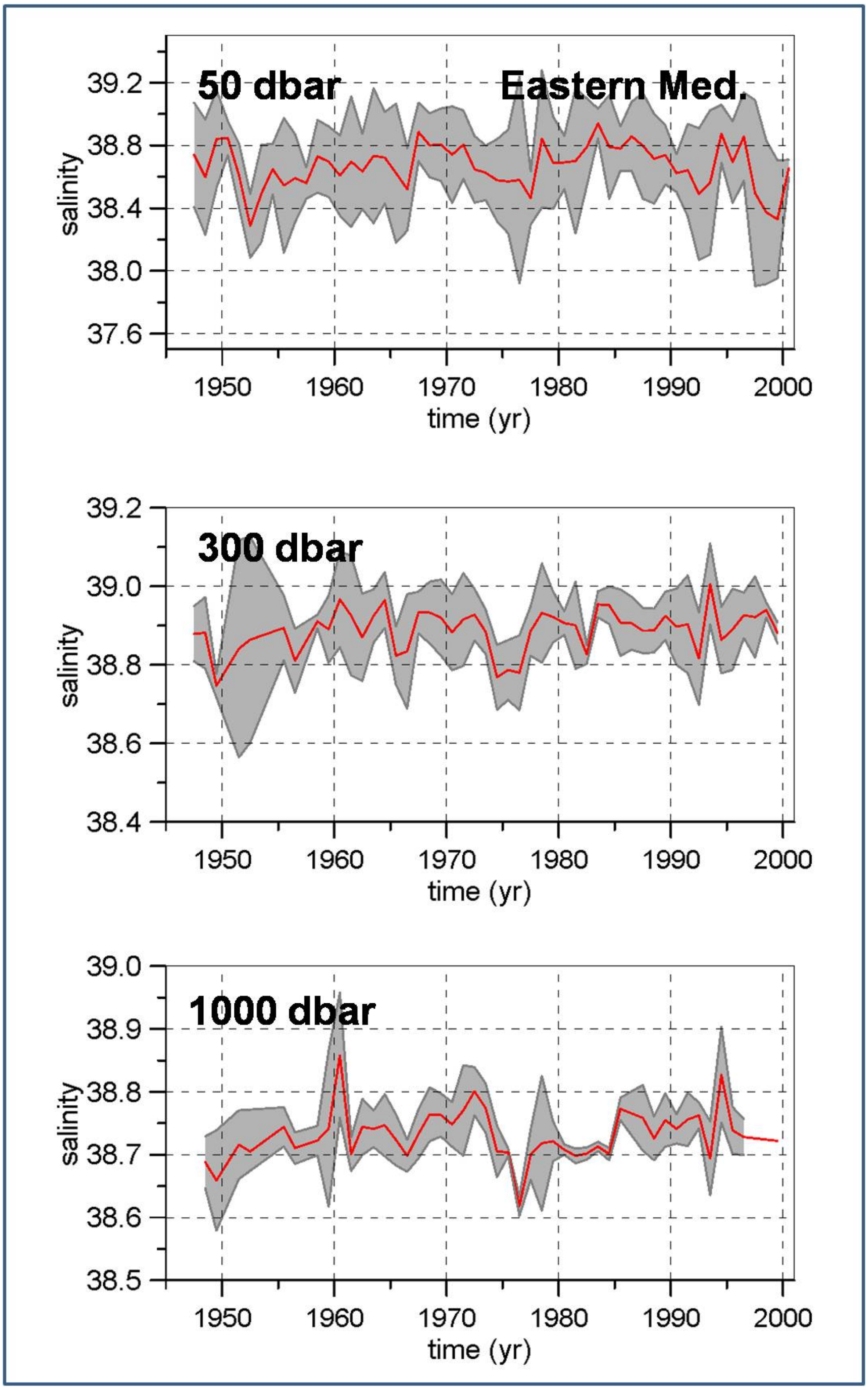
S4. Potential temperature annual time series for different pressure levels. For each year and geographical area a standard deviation was estimated. Finally a standard deviation was estimated for the WMED average value.



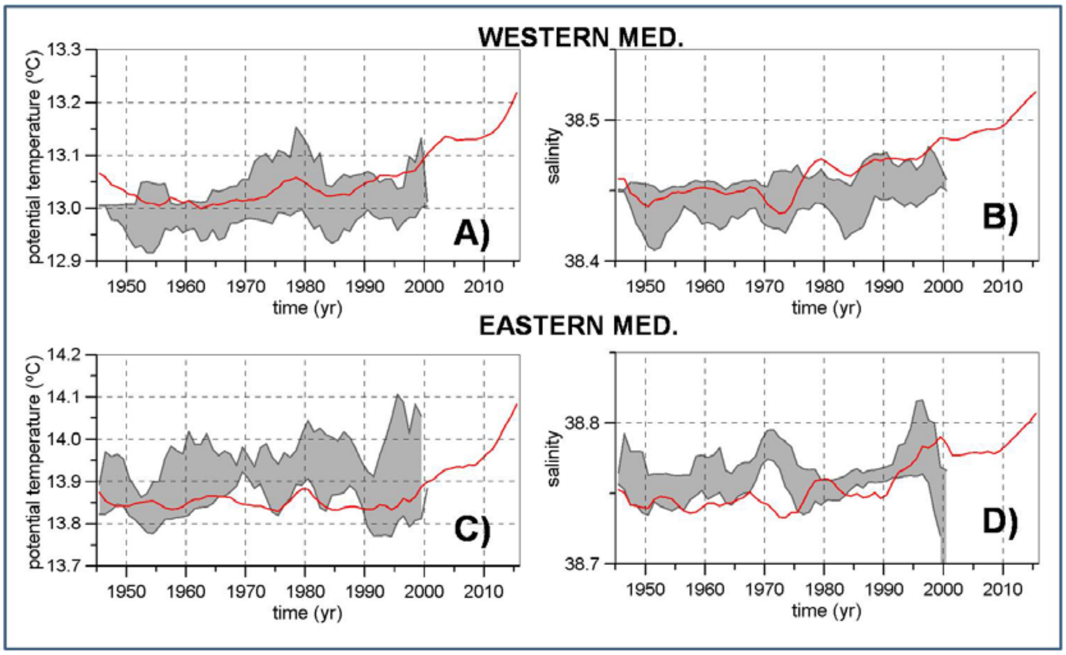
S5. The same as in figure S4, but for the EMED.



S6. The same as in figures S4 and S5, but for the WMED salinity.



S7. The same as in figure S6, but for the EMED.



S8. Grey lines and grey shaded area are the uncertainty for the potential temperature and salinity in the WMED (upper plots) and EMED (lower plots). Red lines are the time series from the EN4 objective analysis.