

Monthly-to-seasonal predictions of durum wheat yield over the Mediterranean Basin

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Supplement.

Supplementary Table S1: List of the climatic indexes used as predictors in the empirical model. The publicly available sources from which these indexes were directly downloaded or computed are also provided.

Short Name	Full Name	Source	Timescale
MED_1, MED_2	Mediterranean SST EOF1, EOF2 [5°W-36°E; 30°N-44°N] (Jung et al., 2006)	IRI-DL	MONTHLY
GUI_1, GUI_2	Guinea Gulf SST EOF1, EOF2 [30°W-14°E; 20°S-20°N]	IRI-DL	MONTHLY
IND_1, IND_2	Indian Ocean SST EOF1, EOF2 [40°E-110°E; 10°S-25°N]	IRI-DL	MONTHLY
AMO	Atlantic Multidecadal Oscillation (Kerr, 2000)	ESRL	QUARTERLY
TRI	Atlantic Tripole (Deser & Timlin, 1997)	IRI-DL	QUARTERLY
MEI	Multivariate ENSO Index (Wolter & Timlin, 1993)	ESRL	QUARTERLY
NAO	North Atlantic Oscillation (Barnston & Livezey, 1987)	CPC	MONTHLY
MZI	Modified Zonal Index (Li & Wang, 2003)	IRI-DL	MONTHLY
PDO	Pacific Decadal Oscillation (Mantua et al., 1997)	JISAO	MONTHLY
PNA	Pacific/North American pattern (Barnston & Livezey, 1997)	IRI-DL	MONTHLY
QBO	Quasi-Biennial Oscillation at 30hPa (Baldwin et al. 2001)	Fu-Berlin	MONTHLY
AO	Arctic Oscillation (Zhou et al., 2001)	CPC	MONTHLY
NAM_1, NAM_2	Geopotential Height 70N - 90N / 1000hPa - 1 hPa EOF1, EOF2	IRI-DL	MONTHLY
SSNOW_1, SSNOW_2	Eurasian Snow Cover EOF1, EOF2	IRI-DL	MONTHLY

Sources
Fu-Berlin: http://www.geo.fu-berlin.de/en/met/ag/strat/produkte/qbo/
JISAO: http://jisao.washington.edu/pdo/
IRI-DL: http://iridl.ldeo.columbia.edu
Mie-Univ: http://www.bio.mie-u.ac.jp/kankyo/shizen/lab1/AOindex.htm
ESRL: http://www.esrl.noaa.gov/psd/data/timeseries/AMO/
CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

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Supplementary Table S2: List of predictors selected for the empirical multi-regressive models. At each prediction date, the selected set of predictors is used for all locations. Figures in the table indicate the predictor's lead time, i.e. the month in which the predictor is observed/computed. An absence of figures means that the climatic index is not a predictor in that specific model. As an example for the first forecast emission, in January, the multi-regressive coefficients are computed for the following observed predictors' set: IND_1 (December), IND_2 (December), AO (December), MZI (December), PDO (December), AMO (December), NAM_1 (December), NAM_2 (December), SSNOW_1 (October), SSNOW_2 (October), MEI (December), NA_2 (December), NA_3 (November).

Forecast issue time / Predictor reference time	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	SSNOW_1	SSNOW_2	MEI	NA_2	NA_3	MED_1	MED_2	GUI_1	GUI_2
January	12	12	12	12	12	12	12	12	10	10	12	12	11				
February	1	1	1	1	1	1	1	1	10	10	1	1	12				
March	2	2	2	2	2	1	2	2	10	10	2	2	1				
April	3	3	3	3	3	2	2	2	10	10	3	3	2				
May	4	4	4	4	4	3	2	2			4	4	3	4	4		
June	5	5	5	5	5	4	3	3			5	5	4	5	5	5	5

Supplementary Tables S3: Coefficients of the predictors of the empirical multi-regressive models used to forecast monthly temperature anomalies at each prediction date. The shown values represent the coefficient mean values averaged over all the locations studied and would be considered as an overview of the order of magnitude of their relative importance. Figures in the first column are the *k*th month after the prediction date (reported in the header of the table) to which the model is referred.

JANUARY.	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	SSNOW_1	SSNOW_2	MEI	NA_2	NA_3
0	0.507	0.493	0.513	-0.387	0.413	0.247	-0.006	0.004	-0.829	-0.290	-0.343	-0.408	0.030
1	-0.805	-0.781	-0.462	0.175	-1.224	0.474	-0.002	-0.006	2.651	-0.786	0.433	0.873	-0.103
2	-0.332	-0.322	-0.039	-0.202	-0.695	2.235	-0.006	0.009	1.053	-0.481	0.609	0.277	-1.611
3	-0.443	-0.430	0.147	-0.186	-0.221	1.780	0.007	0.003	-0.876	-0.358	-0.116	0.043	-2.534
4	-0.597	-0.579	-0.782	0.255	-0.860	2.188	-0.007	0.007	2.343	-0.805	0.303	-0.072	-2.686
5	0.507	1.001	-1.051	0.327	0.392	0.079	-0.011	-0.006	-0.304	0.668	-0.202	-0.928	1.473

FEBRUARY	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	SSNOW_1	SSNOW_2	MEI	NA_2	NA_3
0	-0.107	-0.103	0.543	0.519	-0.712	0.052	0.016	0.041	-5.304	-0.227	0.677	1.493	-0.214
1	0.018	0.018	0.875	-0.338	0.215	-2.112	-0.001	0.016	0.262	-1.426	-0.684	0.287	1.409
2	0.247	0.239	0.917	-0.529	0.669	0.110	0.010	-0.006	1.436	-0.482	0.466	0.150	0.825
3	0.105	0.102	-0.776	1.081	-0.560	-0.327	0.003	0.007	1.089	-1.490	0.239	0.601	0.356
4	-0.713	-0.692	1.001	-0.468	-0.276	-0.106	0.005	0.038	-0.661	-0.272	-0.505	0.242	0.152

MARCH	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	SSNOW_1	SSNOW_2	MEI	NA_2	NA_3
0	0.507	0.265	-0.393	0.725	0.312	-0.397	-0.006	-0.034	-1.115	-1.002	0.117	0.138	-0.757
1	-0.805	0.345	0.723	-0.173	0.620	0.542	0.006	0.008	-0.809	-0.569	0.123	-0.348	-0.572
2	-0.332	0.056	0.323	-0.087	-0.115	-0.153	-0.005	-0.006	1.954	-1.890	-0.259	0.138	-1.595
3	-0.443	-0.488	0.496	-0.626	-0.347	0.065	0.000	-0.006	-0.942	-0.338	0.021	-0.089	-0.161

APRIL	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	SSNOW_1	SSNOW_2	MEI	NA_2	NA_3
0	0.507	0.268	0.014	-0.448	0.081	-0.164	0.001	-0.010	-0.506	-0.853	0.102	0.126	-0.472
1	-0.805	-0.412	1.593	-0.668	0.075	-0.024	0.004	0.002	1.541	-0.213	-0.407	-0.760	1.392
2	-0.332	-0.897	-0.457	0.221	-0.433	1.239	-0.004	-0.007	-1.585	0.839	0.517	-0.318	-0.793

MAY	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	MEI	NA_2	NA_3	MED_1	MED_2
0	0.507	-1.467	-0.131	-0.265	0.728	0.525	-0.008	-0.020	-0.875	0.558	1.420	1.150	-0.621
1	-0.805	-0.112	-0.719	0.264	0.178	-0.276	-0.003	-0.010	-0.742	0.499	0.614	0.157	-0.196

JUNE	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	MEI	NA_2	NA_3	MED_1	MED_2	GUI_1	GUI_2
0	0.49	0.543	-1.443	0.416	-0.502	0.385	1.048	2.884	-0.004	-0.057	0.111	0.033	0.818	0.160	-0.721

Supplementary Table S4: Coefficients of the predictors of the empirical multi-regressive models used to forecast monthly precipitation anomalies at each prediction date. The shown values represent the coefficient mean values averaged over all the locations studied and would be considered as an overview of the order of magnitude of their relative importance. Figures in the first column are the kth month after the prediction date (reported in the header of the table) to which the model is referred.

JANUARY _{y.}	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	SSNOW_1	SSNOW_2	MEI	NA_2	NA_3
0	0.02133	0.03051	0.01805	1.90171	1.80202	0.92306	-3.59643	2.14777	-0.12415	-0.68482	-5.27383	-0.43170	-1.41104
1	0.00644	0.00857	-0.00537	1.19118	0.06899	0.75082	-1.38610	-0.30013	-0.02188	-0.12973	-1.68529	0.90017	0.79982
2	0.00543	0.00466	-0.00721	1.17336	0.61412	-1.38071	-1.18880	1.00007	-0.10400	0.50294	-0.23472	0.53421	-1.43441
3	0.00433	0.00264	0.03601	2.61487	0.10133	0.83077	-2.74168	0.32618	-0.48044	0.51282	6.11448	0.00673	0.07977
4	0.00235	0.00577	0.00066	1.34347	1.30812	0.65217	-2.49152	1.01201	-0.51455	0.23184	-1.63753	-1.34123	-0.77661
5	0.00555	0.00614	-0.01207	-0.07454	-1.72677	0.67741	-0.64415	0.18828	0.16128	-0.15904	1.24990	-1.52139	0.58152

FEBRUARY	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	SSNOW_1	SSNOW_2	MEI	NA_2	NA_3
0	0.02133	0.03051	0.01805	1.90171	1.80202	0.92306	-3.59643	2.14777	-0.12415	-0.68482	-5.27383	-0.43170	-1.41104
1	0.00644	0.00857	-0.00537	1.19118	0.06899	0.75082	-1.38610	-0.30013	-0.02188	-0.12973	-1.68529	0.90017	0.79982
2	0.00543	0.00466	-0.00721	1.17336	0.61412	-1.38071	-1.18880	1.00007	-0.10400	0.50294	-0.23472	0.53421	-1.43441
3	0.00433	0.00264	0.03601	2.61487	0.10133	0.83077	-2.74168	0.32618	-0.48044	0.51282	6.11448	0.00673	0.07977
4	0.00235	0.00577	0.00066	1.34347	1.30812	0.65217	-2.49152	1.01201	-0.51455	0.23184	-1.63753	-1.34123	-0.77661

MARCH	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	SSNOW_1	SSNOW_2	MEI	NA_2	NA_3
0	0.00235	0.00490	0.03183	0.24580	-0.91675	-0.36067	1.07726	-1.12062	-0.23441	-1.64067	5.27923	0.82802	0.48564
1	0.00325	-0.00265	-0.00898	4.90418	-0.20314	-0.33580	-3.38397	0.37495	-0.55523	0.41833	1.69525	1.19715	-0.45609
2	0.00999	-0.01620	-0.01086	-0.30700	0.63584	-0.18666	1.20160	0.35214	-0.55423	0.75935	-0.03927	-0.56832	-0.38844
3	0.00434	-0.00422	0.00902	-0.01666	0.52285	0.10374	0.22788	-0.33583	0.40741	0.41394	1.18156	0.06041	0.61648

APRIL	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	SSNOW_1	SSNOW_2	MEI	NA_2	NA_3
0	0.00035	0.00052	0.00168	4.84806	0.10218	-0.39859	-1.33998	1.35961	-0.64488	0.20612	4.15505	1.49304	-0.49205
1	0.00023	-0.02346	-0.03221	-1.95958	1.27744	0.72646	-0.87391	-1.53487	-0.79597	0.91093	2.22721	-3.05292	0.61654
2	0.00065	0.00061	0.01277	1.68141	0.54914	0.09318	-1.16651	0.71270	-0.22789	0.44579	1.85090	-0.64820	-0.22525

MAY	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	MEI	NA_2	NA_3	MED_1	MED_2
0	0.00346	-0.00835	-0.01989	-0.62058	-1.46657	1.14983	0.52475	-0.13070	1.41982	0.72774	-0.87524	0.55758	-0.26485
1	0.00949	-0.00345	-0.01026	-0.19605	-0.11188	0.15711	-0.27600	-0.71921	0.61384	0.17842	-0.74192	0.49897	0.26438

JUNE	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	MEI	NA_2	NA_3	MED_1	MED_2	GUI_1	GUI_2
0	0.00657	-0.00507	0.05222	0.55941	-1.22320	1.31587	-0.54875	1.73142	-0.42110	-0.44992	-2.75581	-0.82642	0.75487	-1.01837	-0.53708