

Data Files Accompanying: Ocean Surface Salinity Response to Atmospheric River Precipitation in the California Current System

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Data

This data package includes the data and analysis code associated with the manuscript listed above. The directory contains raw and processed data from five sources:

- (1) European Centre for Medium-Range Weather Forecasts (ECMWF) Reanalysis (ERA5);
- (2) Scripps Institution of Oceanography (SIO)-generated AR catalog, the SIO-R1 AR catalog;
- (3) California Underwater Glider Network (CUGN) Spray Glider along Line 66.7;
- (4) Monterey Bay Aquarium Research Institute (MBARI) M1 Mooring;
- (5) Modeled outputs from a one-dimensional configuration of the MIT general circulation model (MITgcm);

Introduction

Below are lists of the data and MATLAB R2019b codes used for processing and plotting (Tables 1-3). Descriptions of processing steps are listed below. Figures can be generated by running the codes listed in Table 3 after the processing listed below has been completed. Note that 'F7, F8, F9' needs to be run before 'S5'. Binary files for ERA5 data and MITgcm output are not included, and instead the files are included as '.mat' files created by the processes listed in the steps below.

Processing Steps

Processing steps are listed below. These steps are not required, as all data used to create the figures is included in the repository. If you would like to start from the raw data, however, the following files can be run to make the relevant datasets. Note that in each of the following codes "filepath1" will need to be changed to match the file path on your machine. Additionally, in each of the files called in the following codes "lahoffma" will need to be changed to match the file path on your machine. This will dictate where the file is loaded from and where the data is saved. For the ERA5 processing steps including files P1, P2 & P11 (Table 2) the loadpath should be edited to wherever you have downloaded the binary data (if you are working from the raw data), which you will need to download separately (i.e. in the code, "/project_shared/ERA5/" should be changed).

1. ERA5 Processing Steps (D1--D5, D37): "Processing_ERA5.m"
2. Model Input Processing Steps (D7, D8, D12, D13, D17, D18, D30, D31):
"Processing_ModelInput.m"
3. Model Output Processing Steps (D10 & D22): "Processing_ModelOutput.m"
4. Spray Processing Steps (D29): "Processing_Spray.m"
5. SIOR1 Processing Steps (D24–D25, D38): "Processing_SIOR1.m"
6. MBARI Processing Steps (D36): "Processing_MBARI.m"

Label	File Name	Source Data
D1	ERA5_CCS_0719.mat	ERA5
D2	ERA5_CCS_1619.mat	ERA5
D3	ERA5_daily_properties_SepApr_0719.mat	ERA5
D4	ERA5_daily_properties_SepApr_9219.mat	ERA5
D5	ERA5_tropics.mat	ERA5
D6	EIG_EmP_197901_201612.mat	MBARI
D7	DP_CCS.mat	MITgcm_event
D8	EXF_CCS.mat	MITgcm_event
D9	fundamental_AR	MITgcm_event
D10	FLD_FLT.mat	MITgcm_event
D12	DP_tropics.mat	MITgcm_event
D13	EXF_tropics.mat	MITgcm_event
D14	samos	MITgcm_event
D15	Argo	MITgcm_event
D16	event_tropics	MITgcm_event
D17	DP_seasonal_CCS.mat	MITgcm_seasonal
D18	EXF_seasonal.mat	MITgcm_seasonal
D19	seasonal_coast	MITgcm_seasonal
D20	seasonal_on	MITgcm_seasonal
D21	seasonal_off	MITgcm_seasonal
D22	LeastSquaresSeasonal.mat	MITgcm_seasonal
D23	AR_footprint	SIO_R1
D24	AR_stats_0719.mat	SIO_R1
D25	AR_percentage_rain.mat	SIO_R1
D26	CUGN_line_66.nc	Spray
D27	ancycle_z_66.nc	Spray
D28	anomaly_z_66.nc	Spray
D29	dSSpray.mat	Spray
D30	DP_event.mat	MITgcm_AR/AR_events
D31	EXF_event.mat	MITgcm_AR/AR_events
D32	event_AR	MITgcm_AR/AR_events
D33	AR_events_dS_R_U.mat	MITgcm_AR/AR_events
D34	sea_water_practical_salinity.nc	MBARI
D35	MBARI_0420.mat	MBARI
D36	dSMBARI.mat	MBARI
D37	ERA5_MBARI_hourly_0719.mat	ERA5
D38	AR_rainfall_percentage.mat	SIO_R1

Table 1. Data files.

Label	File Name	Source Data
P1	S1_ReadERA5.m	ERA5
P2	S2_DailyERA5.m	ERA5
P3	S3_daily_rain_wind_0719.m	ERA5
P4	S3_daily_rain_wind_1619.m	ERA5
P5	S4_hourly_props_0719.m	ERA5
P6	S4_hourly_props_9219.m	ERA5
P7	S5_hourly_SA_0719.m	ERA5
P8	S5_hourly_SA_9219.m	ERA5
P9	S6_daily_hourly_SA_0719.m	ERA5
P10	S6_daily_hourly_SA_9219.m	ERA5
P11	S7_ERA5_hourly_tropics.m	ERA5
P12	DepthProfile_AR_CCS.m	MITgcm_AR/AR_sensitivity
P13	EXF_AR_CCS.m	MITgcm_AR/AR_sensitivity
P14	EXF_DepthProfile_tropics.m	MITgcm_event
P15	DepthProfile_seasonal_CCS.m	MITgcm_seasonal
P16	EXF_seasonal_CCS.m	MITgcm_seasonal
P17	MITgcm_seasonal_output.m	MITgcm_seasonal
P18	AR_stats.m	SIO_R1
P19	percent_rain_AR.m	SIO_R1
P20	LeastSquaredSpray.m	Spray
P21	DP_AR_casestudy.m	MITgcm_AR/AR_event
P22	EXF_AR_casestudy.m	MITgcm_AR/AR_event
P23	dS_R_U.m	MITgcm_AR/AR_event
P24	MBARI_dSR.m	MBARI
P25	S8_hourly_MBARI_0719.m	ERA5
P26	AR_rainfall_percentage.m	SIO_R1

Table 2. Processing files.

Figure	File Name	Source Data
F1	F1_obs_data.m	D25, D26 & D38
F2	F2_model_validation.m	D22 & D29
F3	F3_timeseries_MBARI.m	D6, D4 & D19
F4	F4_CCS_anomaly.m	D27, D28 & D1
F5	F5_dS_rain_AR.m	D22, D24 & D29
F6	F6_S1_composite_MBARI.m	D2, D6 & D37
F7,F8, F9, S2	F7_8_9_S2_MITgcm_AR_sensitivity.m	D9 & D8
F10	F10_AR_casestudy.m	D6, D30, D31 & D32
S3	S3_MITgcm_vs_GOTM_all_TR.m	D16
S4	S4_casestudy.m	D31
S5	S5_montecarlo.m	D10

Table 3. Figure generation files.