MTO Minimal, DRCOND

The time series consists of all minimal injury accidents per month from January 1992 to December 1998. So there are $n = 84$ observations. May 1996 corresponds to observation #53 in this series. There are 16 time series corresponding to the variables for hour window (11PM, 12AM, 1AM, 2AM), weekgroup (SunWed, ThuSat) and driver condition (sober, drunk). The codes used and their defintions are given in the table below.

Code	Definition
PM11SS	11PM SunWed Sober
AM12SS	12AM SunWed Sober
AM1SS	1AM SunWed Sober
AM2SS	2AM SunWed Sober
PM11TS	11PM ThuSat Sober
AM12TS	12AM ThuSat Sober
AM1TS	1AM ThuSat Sober
AM2TS	2AM ThuSat Sober
PM11SD	11PM SunWed Drunk
AM12SD	12AM SunWed Drunk
AM1SD	1AM SunWed Drunk
AM2SD	2AM SunWed Drunk
PM11TD	11PM ThuSat Drunk
AM12TD	12AM ThuSat Drunk
AM1TD	1AM ThuSat Drunk
AM2TD	2AM ThuSat Drunk

A step intervention model defined by,

$$z_t = \mu + \delta_1 \xi_t + N_t \tag{1}$$

where N_t is the error term. Based on the pre-intervention data we assume initially that N_t is normal and independent, so ordinary multiple linear regression can be used. The intervention series are defined by,

$$\xi_t = \begin{cases} 0 & t < 53 \\ 1 & t \geq 53 \end{cases}$$

The pre-intervention series is fairly short so the following two-step approach to the ARIMA identification of the error term N_t will be used. In the first stage the model in eqn. (1) is fit using standard regression. Then the residuals, the estimated values, $\hat{N}_t$, are obtained and the residual autocorrelation of these residuals is examined. This approach should be expected to work well and is indeed theoretically superior to the alternative approach of basing the model identification on the pre-intervention residuals. The reason for this is that in the estimates of the autocorrelations of $\hat{N}_t$ are first-order efficient as are the estimates in the pre-intervention approach. However since the sample size is larger, this approach provides better estimates. Residual diagnostic checking did not reveal any significant autocorrelation for these time series.

There is a statistical significant decrease everywhere except at the ThuSat-1AM and ThuSat-2AM windows for both sober and drunk drivers. The results are tabulated and visualized below.

		Estimate	SE	TStat	PValue
PM11SS	1	3.59615	0.241768	14.8744	0.
	ξ	**-1.6899**	**0.391709**	**-4.31419**	**0.0000444032**

		Estimate	SE	TStat	PValue
AM12SS	1	4.53846	0.278886	16.2736	0.
	ξ	**-1.44471**	**0.451846**	**-3.19735**	**0.00197109**

		Estimate	SE	TStat	PValue
AM1SS	1	3.98077	0.29014	13.7202	0.
	ξ	**-1.44952**	**0.470081**	**-3.08355**	**0.00278678**

		Estimate	SE	TStat	PValue
AM2SS	1	4.92308	0.286975	17.1551	0.
	ξ	**-1.70433**	**0.464953**	**-3.66559**	**0.000436712**

		Estimate	SE	TStat	PValue
PM11TS	1	5.30769	0.316432	16.7735	0.
	ξ	**-2.87019**	**0.512679**	**-5.59842**	**2.7958×10^{-7}**

		Estimate	SE	TStat	PValue
AM12TS	1	7.65385	0.388219	19.7153	0.
	ξ	**-2.96635**	**0.628987**	**-4.71607**	**9.73915×10^{-6}**

		Estimate	SE	TStat	PValue
AM1TS	1	3.23077	0.251977	12.8217	0.
	ξ	0.394231	0.408249	0.965663	0.337052

		Estimate	SE	TStat	PValue
AM2TS	1	6.25	0.375654	16.6376	0.
	ξ	0.21875	0.608629	0.359414	0.720209

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		Estimate	SE	TStat	PValue
PM11TD	1	5.30769	0.316432	16.7735	0.
	ξ	**-2.87019**	**0.512679**	**-5.59842**	**2.7958×10^{-7}**

		Estimate	SE	TStat	PValue
AM12TD	1	7.65385	0.388219	19.7153	0.
	ξ	**-2.96635**	**0.628987**	**-4.71607**	**9.73915×10^{-6}**

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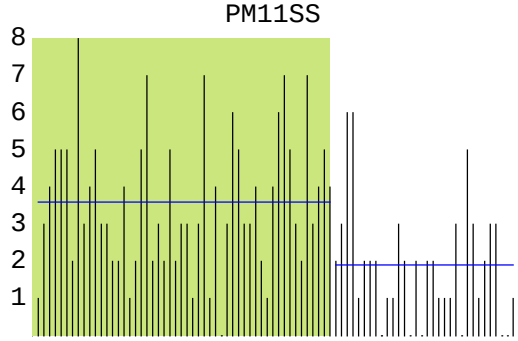
PM11SS



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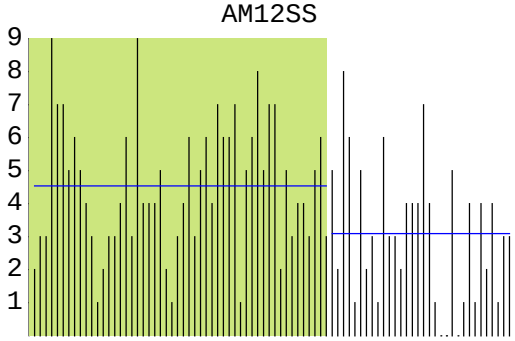

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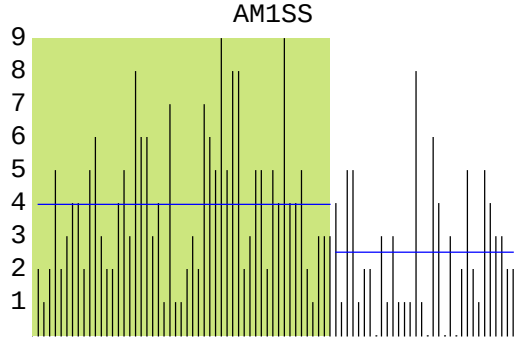

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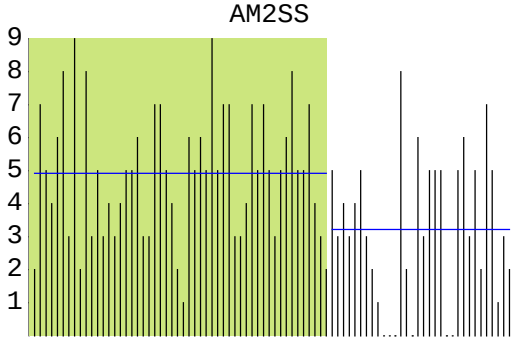

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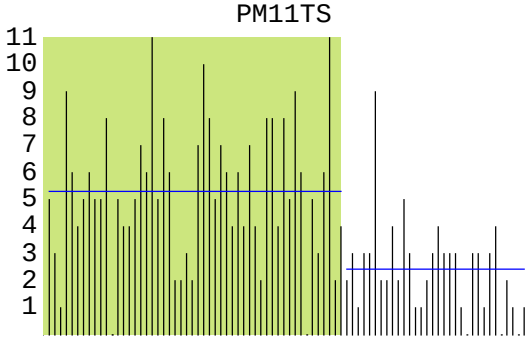

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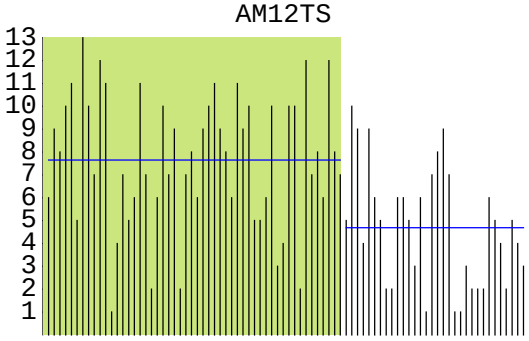

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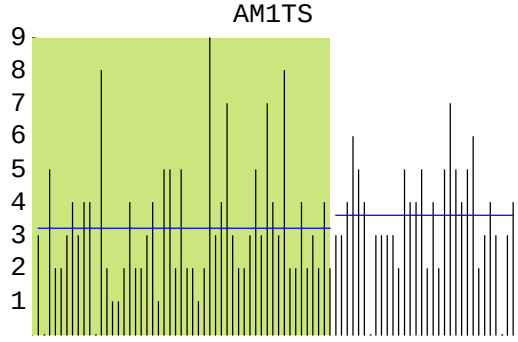

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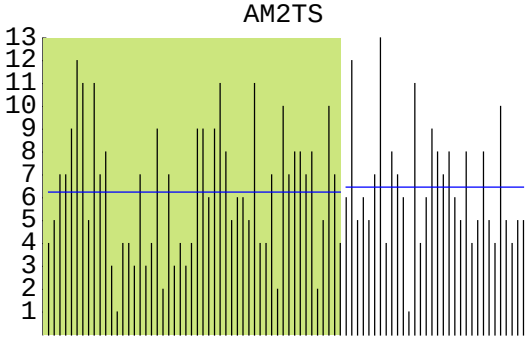

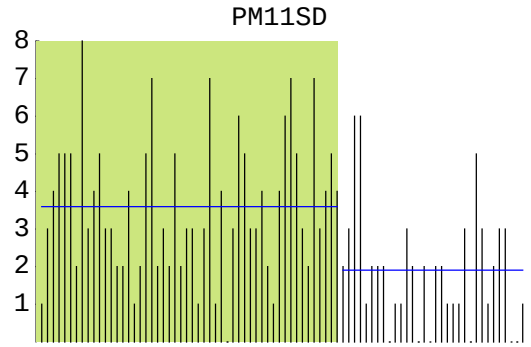
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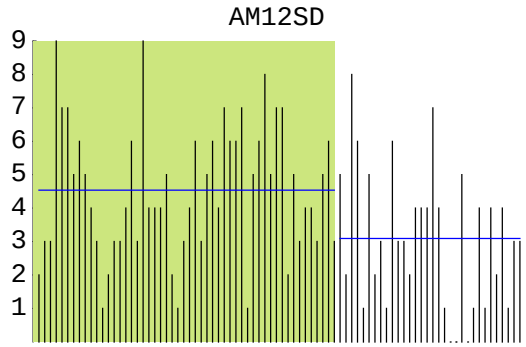
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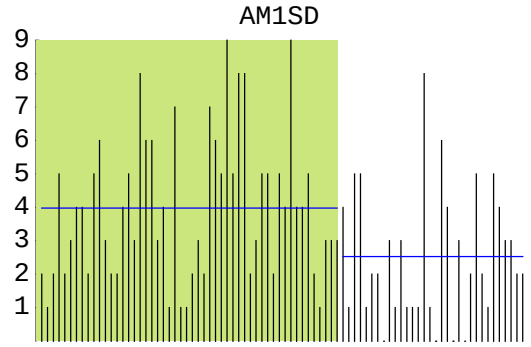
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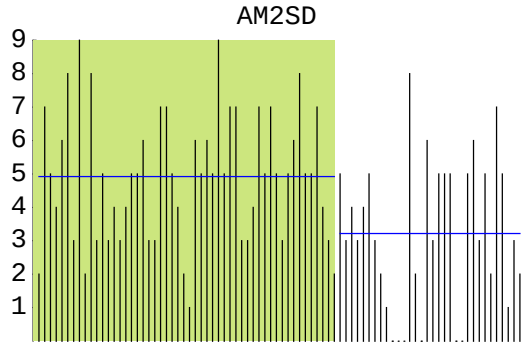
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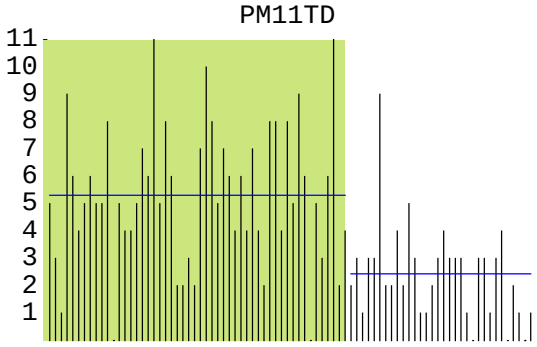
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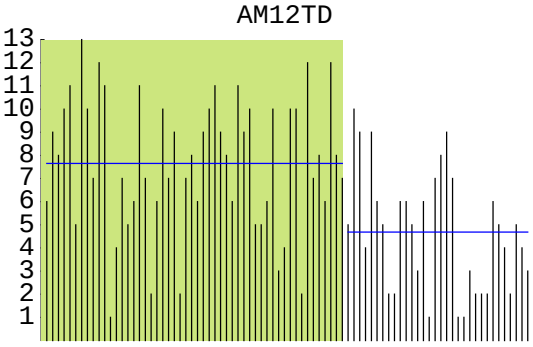
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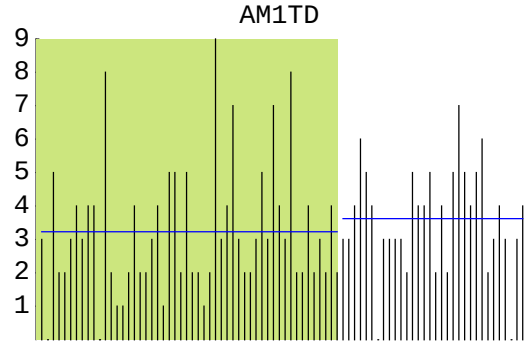
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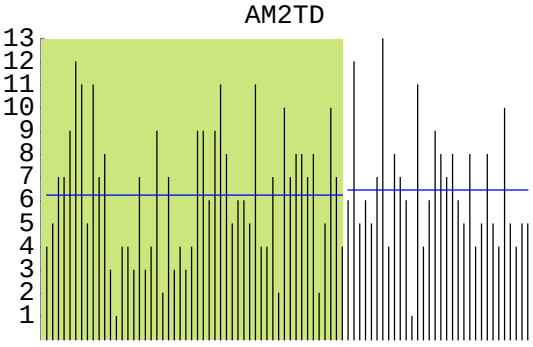
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