South Eastern Australian
Climate initiative

Final report for Project 1.3.3

1.3.3 Atmospheric predictor selection for statistical downscaling

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Updated: October 2007

Abstract:
The optimum calibration of a statistical downscaling model depends critically on the choice of atmospheric predictors used in the training set. This project has investigated the relationships between daily rainfall across the southeast MDB and daily atmospheric variables from the NCEP/NCAR Reanalysis (NNR) dataset. Correlation analysis, classification and regression trees, and generalised boosting machine techniques were used to screen 1904 candidate predictors derived from NNR variables such as sea level pressure and, at specific pressure levels, air temperature, specific humidity, dew-point temperature depression and geopotential height. The results show a consistent dominance of moisture-based variables in certain regions of the domain, as well as pressure and geopotential height derived variables. The seasonality and strength of these relationships will guide the choice of predictor sets and seasonal demarcation to be used in the subsequent SD model calibration *Project 1.3.4*.

Project Objectives:

- Develop methods for the detection and characterisation of the relationships between multi-site daily rainfall and candidate atmospheric predictor sets
- Apply these methods to the NCEP reanalysis to obtain atmospheric predictors for the fitting and testing of the statistical downscaling model

Summary of methods and modifications:

- Review currently available regression and tree-based methods for screening atmospheric predictors
- Choose the most suitable methods and apply them to the reanalysis to produce sets of candidate atmospheric predictors
- If made available in a suitable form and within a suitable time frame, apply the Bayesian hierarchical modelling framework developed under Milestone 1.5.5 to the reanalysis, and compare the resulting predictor set with that obtained by using the approach outlined above
- The predictor sets will be screened by meteorological professionals to ensure its realism and physical consistency, and a final set chosen

Statement of results, their interpretation, and practical significance against each objective:
The NCEP/NCAR Reanalysis (NNR, see http://www.cdc.noaa.gov/cdc/reanalysis/) provides the atmospheric data used to investigate the relationship between multi-site daily rainfall and large-scale atmospheric forcing. NNR atmospheric data are produced for 1958 to present using state-of-the-art assimilation of observed weather data using a global climate-forecasting model that produces interpolated grid output (Kalnay *et al.* 1996). A high level of quality control is applied to the observed data. Many output variables are generated on a global 2.5° by 2.5° latitude-longitude grid such as sea level pressure, temperature and specific humidity at several pressure levels in the atmosphere. This data is available 6 hourly (i.e., 4 times per day) and is averaged to produce daily data for the analyses herein.

Table 1 lists the variables investigated and Figure 1 shows the spatial domain over south-eastern Australia for which these variables were extracted. As the SD model relates atmospheric conditions to regional rainfall on a daily basis, far field atmospheric teleconnections are not considered. Hence the domain is restricted to the vicinity of the rainfall station network.

Three techniques are intercompared, correlation analysis, Classification and Regression Trees (CART), and Generalised Boosting Machine (GBM). All techniques used a set of candidate predictors comprised of each of the variables in Table 1 for each of the 30 grid squares in Figure 1, as well as all north – south, east – west, northeast – southwest and southeast – northwest gradients for all adjacent grid squares. This produced 1904 candidate predictors in total.

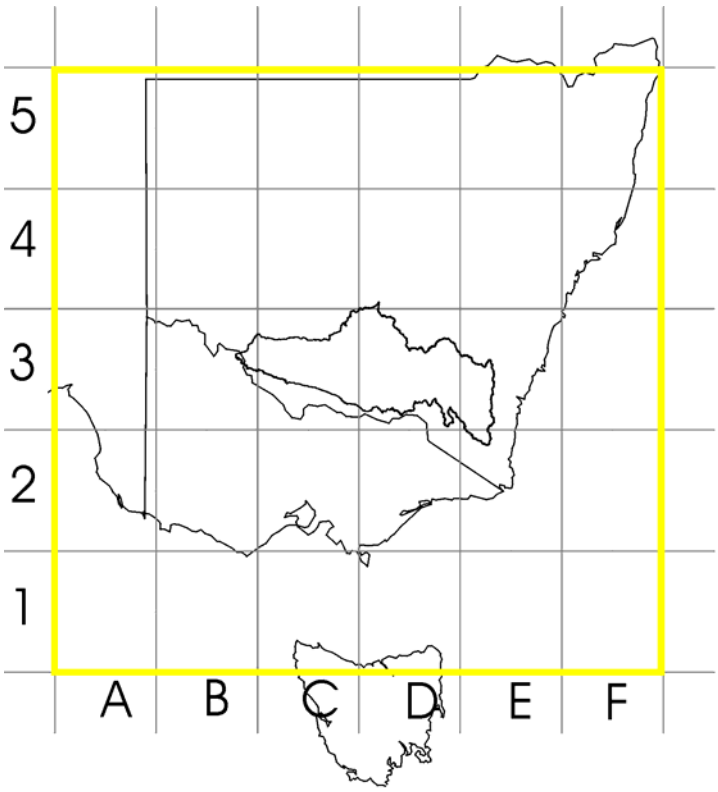

Figure. 1. Geographic domain of atmospheric variables. Grid is NCEP/NCAR Reanalysis grid, 2.5^{o} by 2.5^{o}. Outline of the Murrumbidgee Basin is shown as a point of reference.

Table 1: Atmospheric variables

Atmospheric field	Abbreviation / Definition
Mean sea-level pressure	$MSLP$
Air temperature at 500 hPa	T^{500}
Air temperature at 700 hPa	T^{700}
Air temperature at 850 hPa	T^{850}
Dew point temperature depression at 500 hPa	$DT_d^{500} = T^{500} - T_d^{500}$
Dew point temperature depression at 700 hPa	$DT_d^{700} = T^{700} - T_d^{700}$
Dew point temperature depression at 850 hPa	$DT_d^{850} = T^{850} - T_d^{850}$
Specific humidity at 500 hPa	SH^{500}
Specific humidity at 700 hPa	SH^{700}
Specific humidity at 850 hPa	SH^{850}
Total totals*	$\left(T_d^{850} - T^{500}\right) + \left(T^{850} - T^{500}\right)$
Geopotential height at 500 hPa	GPH^{500}
Geopotential height at 700 hPa	GPH^{700}
Geopotential height at 850 hPa	GPH^{850}
Geopotential height at 1000 hPa	GPH^{1000}
Thickness	$GPH^{700} - \left(GPH^{500} - GPH^{1000}\right)$

* **Total totals:** the total totals index is an index of atmospheric instability composed of two indices: the cross total and the vertical total. The cross total is a measure of how buoyant the air parcel is due to less dense, moist air in the lower levels. It is defined as the difference between the 850 hPa dew point temperature and the 500 hPa temperature. The vertical total is a measure of how buoyant the air parcel is due to warm air at lower levels. It is defined as the difference between the 850 hPa temperature and the 500 hPa temperature. The sum of the cross and vertical totals is the total totals index.

Correlation analysis involved computing simple linear correlation between the 1904 candidate predictors and daily rainfall at 10 high quality gauges across the study region. Appendix 1 presents the mean absolute values of the computed correlations on a seasonal basis. Initially the analysis was attempted on a monthly basis, but due to small sample sizes these results proved inconsistent. Hence the results in Appendix 1 are on a seasonal basis.

CART and GBM are examples of data mining techniques. Data mining is concerned with constructing statistical models to help gain an understanding of the predictive relationships represented in the data. In a statistical setting this is known as multiple regression and the task can be performed either parametrically by global modelling (e.g. linear regression), or nonparametrically (e.g. to estimate an unknown function f from given data).

CART uses binary recursive partitioning, successively splitting the response variable along coordinate axes of the predictor variables so as to select a split which maximally distinguishes the response variable in the left and the right branches. Splitting continues until nodes are pure or data are too sparse; terminal nodes are called leaves, while the initial node is called the root (Breiman *et al.*, 1984). This technique was applied with the 1904 atmospheric predictors as the predictor variables and the rainfall pattern across the region as the response variable. The rainfall pattern was defined as an integer representing the pattern of wet and dry days across 7 gauges across the region. With seven gauges, each potentially wet or dry, there are 128 possible rainfall occurrence patterns (2^7). This analysis was undertaken on a monthly basis, and the predictors that best differentiated rainfall patterns are summarised in Table 2.

Generalised Boosting Machine (GBM) is the process of iteratively adding basis functions in a greedy fashion so that each additional basis function further reduces the selected loss function as square error in Multivariate Adaptive Regression Splines (MARS, Friedman 1991). Ridgeway (1999) gives a good review on boosting and shows how boosting methods relate to more standard statistical techniques. In addition to many features of boosting documented in Friedman's gradient boosting machine (Friedman, 2001), an important feature of GBM is that it involves gaining an understanding of those particular input predictor variable combinations that are most influential in contributing to the variations of the estimate $\hat{f}(\mathbf{X})$ of the unknown function $f(\mathbf{X})$. This can be quantified by the relative influence I_j of the individual input predictor variable X_j ($j = 1,\ldots,m$), on the variation of $\hat{f}(\mathbf{X})$ over the joint input predictor variable distribution as

$$I_j = \left(E_{\mathbf{x}} \left[\frac{\partial \hat{f}(\mathbf{X})}{\partial X_j} \right]^2 \mathrm{var}_{\mathbf{x}} \left[X_j \right] \right)$$

There are various methods to calculate the relative influence I_j depending on different approximations of $\hat{f}(\mathbf{x})$ (Breiman *et al.* 1984; Friedman, 2001). A GBM package in R called *gbm* has been implemented by Ridgeway (2003) following Friedman's gradient boosting machine (Friedman, 2001). In our rainfall studies, we modified *gbm* to calculate the relative influence score for each of predictor variables to the variations of estimated $\hat{f}(\mathbf{x})$. By doing so, we can select the most influential predictor variable combinations related to variations of rainfall. The GBM technique was applied on a monthly basis using all 1904 predictors. Table 3 shows the dominant predictors for each month.

Table 2: CART selected predictors (listed in order of significance within month)

JAN	NE-SW_dtd.0700_18-12, dtd.0700_4_2, dtd.0700_3_4, NE-SW_hgt.0850_30-24, shum.0700_3_5, dtd.0700_5_3, SE-NW_hgt.0700_7-3
FEB	NE-SW_shum.0700_18-12, SE-NW_hgt.0700_18-14, dtd.0700_3_3, NE-SW_hgt.0850_27-21, SE-NW_hgt.0700_26-22, NE-SW_totaltotals_20-14, SE-NW_hgt.1000_13-9
MAR	dtd.0700_4_4, dtd.0700_2_3, NE-SW_dtd.0700_18-12, E-W_hgt.0500_17-12, E-W_hgt.0500_22-17, N-S_hgt.1000_27-26, NE-SW_totaltotals_30-24
APR	dtd.0700_4_4, hgt.0500_1_2, SE-NW_air.0700_16-12, SE-NW_thickness_8-4, shum.0500_5_2, NE-SW_hgt.0850_14-8, NE-SW_hgt.0850_18-12
MAY	dtd.0700_4_4, NE-SW_hgt.1000_19-13, NE-SW_hgt.0850_15-9, E-W_slp_6-1, SE-NW_hgt.1000_9-5, E-W_air.0500_21-16, NE-SW_hgt.0500_20-14
JUN	NE-SW_hgt.0850_20-14, SE-NW_hgt.0700_11-7, dtd.0850_4_4, dtd.0700_6_3, N-S_hgt.0500_17-16, N-S_hgt.0500_10-9, NE-SW_slp_25-19
JUL	dtd.0700_4_3, E-W_hgt.0500_23-18, SE-NW_slp_11-7, NE-SW_slp_13-7, NE-SW_hgt.0850_19-13, N-S_hgt.0700_5-4, NE-SW_slp_13-7
AUG	NE-SW_hgt.0850_25-19, SE-NW_hgt.1000_16-12, dtd.0700_2_3, totaltotals_5_2, N-S_hgt.1000_27-26, dtd.0700_4_4, NE-SW_shum.0500_22-16
SEP	dtd.0700_3_3, SE-NW_hgt.1000_9-5, SE-NW_slp_12-8, E-W_hgt.0700_23-18, E-W_shum.0700_18-13, dtd.0700_5_3, E-W_hgt.0850_15-10
OCT	dtd.0700_3_3, NE-SW_hgt.0850_25-19, dtd.0700_5_4, E-W_slp_10-5, NE-SW_hgt.1000_15-9, SE-NW_hgt.0850_8-4, N-S_hgt.0850_22-21
NOV	dtd.0700_3_3, hgt.0500_1_3, N-S_slp_18-17, shum.0850_6_2, shum.0850_5_4, shum.0700_4_4, SE-NW_hgt.0850_26-22
DEC	NE-SW_dtd.0700_18-12, dtd.0700_3_2, SE-NW_hgt.0500_17-13, E-W_hgt.0700_10-5, NE-SW_shum.0850_19-13, E-W_hgt.0850_6-1, dtd.0700_5_4

Table 3: Boosting selected predictors (listed in order of significance within month)

JAN	shum.0850_4_3, shum.0500_6_2, shum.0500_5_2, hgt.0700_25 – 20, hgt.0700_ 24 - 19, shum.0500_6_3, dtd.0700_3_3
FEB	shum.0500_4_2, shum.0850_4_4, E-W_hgt.0850_29 – 24, E-W_hgt.0500_20 – 15, shum.0500_5_2, E-W_hgt.0700_20 – 15, E-W_hgt.0700_19 – 14
MAR	dtd.0850_4_3, dtd.0700_4_3, E-W_hgt.1000_30 – 25, E-W_hgt.0850_24 – 19, shum.0850_4_3, E-W_hgt.0850_29 – 24, E-W_hgt.0850_30 – 25
APR	E-W_hgt.0850_29 – 24, shum.0700_4_2, shum.0500_5_2, E-W_hgt.0850_28 – 23, shum.0850_4_3, E-W_hgt.0500_19 – 14, dtd.0700_3_3
MAY	shum.0850_4_3, E-W_hgt.0850_24 – 19, dtd.0700_3_3, E-W_hgt.0850_28 – 23, E-W_hgt.0700_24 – 19, shum.0700_4_3, E-W_hgt.0700_20 – 15
JUN	dtd.0700_3_3, SE-NW_hgt.0700_26 – 22, dtd.0700_4_3, SE-NW_hgt.0850_26 – 22, dtd.0850_4_3, shum.0500_4_2, SE-NW_hgt.1000_9 – 5
JUL	shum.0700_4_3, NE-SW_hgt.1000_25 – 19, SE-NW_thickness_26 – 22, dtd.0700_4_3, shum.0700_5_3, shum.0500_6_3, E-W_hgt.0700_28 - 23
AUG	E-W_hgt.0850_24 – 19, E-W_hgt.0850_29 – 24, shum.0850_4_3, NE-SW_hgt.0850_25 – 19, E-W_hgt.0850_28 – 23, SE-NW_hgt.1000_9 – 5, dtd.0700_3_3
SEP	E-W_hgt.0850_29 – 24, E-W_hgt.0850_28 – 23, dtd.0700_3_3, shum.0850_4_3, dtd.0500_4_3, E-W_hgt.0500_23 – 18, E-W_hgt.0700_24 - 19
OCT	dtd.0700_4_3, dtd.0700_3_3, E-W_hgt.0850_28 – 23, E-W_hgt.0700_24 – 19, dtd.0850_3_3, shum.0850_4_3, E-W_hgt.0700_19 - 14
NOV	dtd.0700_3_3, dtd.0700_4_3, shum.0850_4_3, SE-NW_slp_9 – 5, SE-NW_hgt.0700_16 – 12, N-S_hgt.0850_12 – 11, E-W_hgt.0700_24 - 19
DEC	shum.0850_4_3, E-W_hgt.0850_29 – 24, dtd.0700_4_3, shum.0850_3_2, E-W hgt.0850_28 – 23, shum.0850_3_3, shum.0850_2_3

It is apparent that there is great benefit in applying multiple methods and examining similarities and differences in results, rather than trying to identify the superior method. Comparing the results from all three techniques allows us to search for consistencies, which improves our confidence in the results obtained.

These results allow us to select a set of candidate predictors to be used in the SD model calibration in *Project 1.3.4*. As the SD model is calibrated on a seasonal basis, the changes in the dominant predictors across the annual cycle will influence the demarcation of seasons that will be used for SD model calibration. Not unexpectedly, the results in Tables 2 and 3 and Appendix 1 show that many candidate predictors are similar variables in similar regions. This presents the problem of multiplicity, i.e. over specification due to co-linearity or high correlation between candidate predictors. This will be taken into account when developing predictor combinations input into the SD calibration in *Project 1.3.4*, to avoid calibrating using data sets of co-linear or highly correlated candidate predictors. The final selection of predictors will be refined during SD calibration in *Project 1.3.4*, where parsimony will be assessed using the Bayes Information Criterion (BIC), a

weighted statistical measure assessing the relative performance of SD models using different combinations of number of weather states and predictor sets.

List of publication titles:
No publications to date. A paper is planned.

References

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Ridgeway, G., 2003. The **gbm** Package. *The Comprehensive R Archive Network (CRAN)*, http://cran.r-project.org

Project Milestone Reporting Table

To be completed prior to commencing the project				Completed at each Milestone date	
Milestone description[1]	Performance indicators[2]	Completion date[3]	Budget[4] for Milestone ($)	Progress	Recommended changes to workplan
1. Determine methodology for quantifying predictor – predictand relationship.	Selection of methods documented. (4 pages or fewer)	30/09/2006	10k	Completed	Nil
2. Apply the selected method to the selected station set.	Candidate predictor sets selected.	31/12/2006	10k	Completed	Nil

Appendix 1: Rainfall / Predictor Correlation Analysis (6 by 5 grid in Figure 1) Localised areas of higher correlation (not relative or necessarily significant) shown in yellow.

Winter (Apr-Sep)

slp

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]
[1,]	0.298	0.320	0.320	0.291	0.240	0.174
[2,]	0.319	0.346	0.343	0.308	0.256	0.195
[3,]	0.323	0.348	0.344	0.310	0.258	0.198
[4,]	0.302	0.322	0.316	0.287	0.243	0.186
[5,]	0.255	0.265	0.256	0.231	0.199	0.153

East-West slp

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	0.1173	0.0909	0.184	0.200	0.179
[2,]	0.1186	0.1254	0.203	0.183	0.188
[3,]	0.0930	0.1250	0.170	0.168	0.230
[4,]	0.0724	0.1032	0.148	0.191	0.261
[5,]	0.0520	0.0868	0.143	0.193	0.242

North-South slp

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]
[1,]	0.2582	0.288	0.2771	0.241	0.205	0.1924
[2,]	0.2045	0.203	0.1926	0.189	0.166	0.1308
[3,]	0.1215	0.116	0.1188	0.123	0.125	0.0951
[4,]	0.0786	0.088	0.0938	0.101	0.107	0.0892

NorthEast-SouthWest slp

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	0.1652	0.2462	0.325	0.351	0.321
[2,]	0.1300	0.2113	0.285	0.308	0.276
[3,]	0.0972	0.1511	0.199	0.228	0.221
[4,]	0.0843	0.0896	0.106	0.117	0.140

SouthEast-NorthWest slp

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	0.2960	0.1909	0.0782	0.0615	0.0494
[2,]	0.2240	0.1033	0.0697	0.0564	0.0480
[3,]	0.1159	0.0624	0.0666	0.0735	0.1259
[4,]	0.0635	0.0907	0.1261	0.1699	0.2311

air.0500

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]
[1,]	0.0471	0.0322	0.0384	0.0709	0.0980	0.1179
[2,]	0.0911	0.0594	0.0348	0.0433	0.0773	0.1045
[3,]	0.1231	0.0876	0.0449	0.0283	0.0583	0.0909
[4,]	0.1300	0.0946	0.0485	0.0237	0.0499	0.0814
[5,]	0.1156	0.0824	0.0399	0.0265	0.0459	0.0734

East-West air.0500

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	0.140	0.175	0.186	0.157	0.0972
[2,]	0.156	0.209	0.229	0.202	0.1347
[3,]	0.171	0.235	0.257	0.227	0.1562
[4,]	0.180	0.242	0.259	0.227	0.1565
[5,]	0.175	0.225	0.235	0.203	0.1393

North-South air.0500

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]
[1,]	0.1504	0.1385	0.1150	0.0850	0.0549	0.0332
[2,]	0.1176	0.1117	0.1011	0.0867	0.0715	0.0575
[3,]	0.0462	0.0494	0.0526	0.0554	0.0553	0.0521
[4,]	0.0575	0.0500	0.0385	0.0270	0.0295	0.0390

NorthEast-SouthWest air.0500

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	0.1921	0.202	0.188	0.149	0.0949

Summer (Oct-Mar)

slp

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]
[1,]	0.160	0.184	0.184	0.156	0.120	0.0845
[2,]	0.176	0.211	0.213	0.182	0.150	0.1162
[3,]	0.181	0.216	0.215	0.188	0.162	0.1267
[4,]	0.168	0.197	0.204	0.186	0.158	0.1160
[5,]	0.129	0.145	0.150	0.138	0.115	0.0785

East-West slp

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	0.1036	0.0581	0.1074	0.1114	0.105
[2,]	0.1442	0.0694	0.1167	0.0722	0.102
[3,]	0.1144	0.0749	0.0858	0.0536	0.122
[4,]	0.1104	0.0597	0.0631	0.0869	0.161
[5,]	0.0807	0.0444	0.0621	0.1039	0.157

North-South slp

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]
[1,]	0.1041	0.1641	0.1721	0.1453	0.1572	0.1554
[2,]	0.0964	0.0938	0.0759	0.0920	0.1108	0.0972
[3,]	0.0610	0.0632	0.0829	0.1039	0.0947	0.0580
[4,]	0.0596	0.0764	0.0808	0.0914	0.1180	0.1103

NorthEast-SouthWest slp

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	0.0577	0.1144	0.1770	0.1916	0.1904
[2,]	0.0644	0.0970	0.1369	0.1347	0.1528
[3,]	0.0714	0.0824	0.1253	0.1336	0.1293
[4,]	0.1098	0.0875	0.0816	0.0779	0.0837

SouthEast-NorthWest slp

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	0.2172	0.1371	0.0499	0.0454	0.0480
[2,]	0.1787	0.0629	0.0386	0.0416	0.0314
[3,]	0.0956	0.0473	0.0430	0.0421	0.1013
[4,]	0.0414	0.0535	0.0785	0.1189	0.1935

air.0500

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]
[1,]	0.0380	0.0202	0.0140	0.0330	0.0537	0.0671
[2,]	0.0674	0.0465	0.0200	0.0242	0.0453	0.0654
[3,]	0.0883	0.0641	0.0309	0.0207	0.0414	0.0642
[4,]	0.0908	0.0641	0.0316	0.0220	0.0436	0.0675
[5,]	0.0766	0.0490	0.0274	0.0267	0.0537	0.0756

East-West air.0500

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	0.095	0.127	0.139	0.119	0.0689
[2,]	0.114	0.157	0.175	0.156	0.1044
[3,]	0.134	0.180	0.197	0.177	0.1241
[4,]	0.150	0.191	0.200	0.176	0.1220
[5,]	0.155	0.189	0.190	0.160	0.1095

North-South air.0500

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]
[1,]	0.1176	0.1021	0.0786	0.0498	0.0221	0.0163
[2,]	0.0934	0.0753	0.0532	0.0310	0.0165	0.0112
[3,]	0.0305	0.0249	0.0204	0.0165	0.0204	0.0250
[4,]	0.0368	0.0444	0.0484	0.0486	0.0450	

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[2,] 0.1756 0.200 0.200 0.172 0.1228
[3,] 0.1243 0.154 0.168 0.157 0.1214
[4,] 0.0703 0.105 0.128 0.130 0.1090

 SouthEast-NorthWest air.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0424 0.0208 0.0367 0.0475 0.0426
[2,] 0.0271 0.0544 0.0818 0.0781 0.0599
[3,] 0.0891 0.1299 0.1407 0.1183 0.0752
[4,] 0.1551 0.1791 0.1715 0.1332 0.0761

 air.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0877 0.0628 0.0413 0.0322 0.0575
0.0849
[2,] 0.1415 0.1132 0.0742 0.0334 0.0324
0.0684
[3,] 0.1664 0.1358 0.0914 0.0398 0.0238
0.0642
[4,] 0.1580 0.1263 0.0806 0.0291 0.0297
0.0673
[5,] 0.1276 0.0961 0.0542 0.0241 0.0370
0.0671

 East-West air.0700
     [,1]  [,2]  [,3]  [,4]  [,5]
[1,] 0.119 0.146 0.180 0.185 0.146
[2,] 0.131 0.184 0.231 0.235 0.185
[3,] 0.142 0.214 0.260 0.257 0.198
[4,] 0.157 0.223 0.257 0.245 0.181
[5,] 0.160 0.209 0.225 0.203 0.144

 North-South air.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.1961 0.1834 0.1552 0.1162 0.0789
0.0512
[2,] 0.1051 0.0993 0.0814 0.0622 0.0453
0.0327
[3,] 0.0436 0.0453 0.0477 0.0439 0.0339
0.0224
[4,] 0.1192 0.1156 0.0980 0.0673 0.0312
0.0103

 NorthEast-SouthWest air.0700
      [,1]   [,2]  [,3]   [,4]   [,5]
[1,] 0.2116 0.2218 0.219 0.1955 0.1472
[2,] 0.1538 0.1726 0.182 0.1725 0.1340
[3,] 0.0745 0.1055 0.125 0.1290 0.1053
[4,] 0.0297 0.0506 0.080 0.0973 0.0887

 SouthEast-NorthWest air.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0939 0.0473 0.0301 0.0535 0.0588
[2,] 0.0314 0.0615 0.1140 0.1328 0.1112
[3,] 0.1250 0.1743 0.1979 0.1843 0.1361
[4,] 0.1966 0.2224 0.2182 0.1810 0.1167

 air.0850
      [,1]   [,2]   [,3]   [,4]  [,5]  [,6]
[1,] 0.0444 0.0389 0.0641 0.0899 0.113 0.129
[2,] 0.0672 0.0359 0.0396 0.0750 0.110 0.132
[3,] 0.0849 0.0414 0.0292 0.0651 0.108 0.134
[4,] 0.0886 0.0479 0.0273 0.0588 0.105 0.133
[5,] 0.0831 0.0456 0.0256 0.0568 0.102 0.130

 East-West air.0850
     [,1]  [,2]  [,3]   [,4]   [,5]
[1,] 0.207 0.181 0.134 0.0791 0.0515
[2,] 0.224 0.218 0.185 0.1238 0.0563
[3,] 0.218 0.230 0.213 0.1648 0.0800
[4,] 0.198 0.222 0.221 0.1880 0.1107
[5,] 0.175 0.205 0.214 0.1917 0.1257

 North-South air.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.1175 0.1137 0.0915 0.0546 0.0174
0.0195
0.0413

 NorthEast-SouthWest air.0500
      [,1]   [,2]  [,3]   [,4]   [,5]
[1,] 0.1428 0.1476 0.136 0.1031 0.0526
[2,] 0.1306 0.1389 0.134 0.1084 0.0647
[3,] 0.0895 0.1010 0.101 0.0847 0.0524
[4,] 0.0536 0.0642 0.067 0.0563 0.0348

 SouthEast-NorthWest air.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0404 0.0228 0.0401 0.0549 0.0500
[2,] 0.0284 0.0442 0.0763 0.0858 0.0729
[3,] 0.0647 0.1068 0.1295 0.1267 0.1004
[4,] 0.1289 0.1586 0.1660 0.1485 0.1128

 air.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0826 0.0692 0.0471 0.0174 0.0232
0.0455
[2,] 0.1192 0.1032 0.0751 0.0351 0.0187
0.0439
[3,] 0.1338 0.1144 0.0813 0.0364 0.0206
0.0477
[4,] 0.1204 0.0977 0.0625 0.0260 0.0286
0.0581
[5,] 0.0900 0.0650 0.0340 0.0227 0.0459
0.0721

 East-West air.0700
      [,1]  [,2]  [,3]  [,4]  [,5]
[1,] 0.0687 0.108 0.149 0.154 0.117
[2,] 0.0846 0.143 0.192 0.198 0.156
[3,] 0.1023 0.167 0.212 0.213 0.165
[4,] 0.1193 0.177 0.208 0.198 0.147
[5,] 0.1323 0.175 0.188 0.168 0.118

 North-South air.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.1390 0.1275 0.1022 0.0673 0.0277
0.0154
[2,] 0.0793 0.0636 0.0398 0.0190 0.0131
0.0255
[3,] 0.0290 0.0320 0.0440 0.0524 0.0530
0.0489
[4,] 0.0942 0.1009 0.0999 0.0898 0.0741
0.0591

 NorthEast-SouthWest air.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.1397 0.1515 0.1535 0.1330 0.0844
[2,] 0.0974 0.1148 0.1245 0.1143 0.0767
[3,] 0.0454 0.0598 0.0742 0.0742 0.0498
[4,] 0.0225 0.0242 0.0358 0.0391 0.0274

 SouthEast-NorthWest air.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0883 0.0388 0.0228 0.0672 0.0793
[2,] 0.0347 0.0430 0.0991 0.1267 0.1185
[3,] 0.0897 0.1436 0.1775 0.1787 0.1472
[4,] 0.1715 0.2038 0.2105 0.1890 0.1439

 air.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0730 0.0368 0.0163 0.0183 0.0313
0.0405
[2,] 0.0951 0.0545 0.0232 0.0245 0.0464
0.0633
[3,] 0.1023 0.0643 0.0310 0.0297 0.0565
0.0795
[4,] 0.0930 0.0600 0.0355 0.0366 0.0625
0.0877
[5,] 0.0726 0.0461 0.0356 0.0448 0.0671
0.0914

 East-West air.0850
     [,1]  [,2]   [,3]   [,4]   [,5]
```

```
[2,] 0.0612 0.0770 0.0721 0.0504 0.0201
0.0167
[3,] 0.0216 0.0307 0.0374 0.0299 0.0135
0.0209
[4,] 0.0388 0.0221 0.0106 0.0152 0.0160
0.0218

 NorthEast-SouthWest air.0850
      [,1]  [,2]  [,3]   [,4]   [,5]
[1,] 0.1942 0.173 0.132 0.0752 0.0307
[2,] 0.1602 0.164 0.148 0.1048 0.0394
[3,] 0.1200 0.145 0.149 0.1223 0.0595
[4,] 0.0803 0.117 0.136 0.1253 0.0770

 SouthEast-NorthWest air.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0556 0.0571 0.0624 0.0589 0.0435
[2,] 0.1095 0.1064 0.1000 0.0812 0.0487
[3,] 0.1420 0.1384 0.1278 0.1037 0.0625
[4,] 0.1554 0.1567 0.1485 0.1219 0.0743

 shum.0500
      [,1]  [,2]  [,3]  [,4]  [,5]  [,6]
[1,] 0.0809 0.139 0.195 0.226 0.238 0.212
[2,] 0.0768 0.160 0.232 0.278 0.290 0.253
[3,] 0.0736 0.167 0.258 0.331 0.333 0.295
[4,] 0.0590 0.139 0.240 0.318 0.325 0.292
[5,] 0.0362 0.079 0.150 0.221 0.245 0.220

 East-West shum.0500
     [,1]  [,2]   [,3]   [,4]   [,5]
[1,] 0.158 0.131 0.0775 0.0548 0.0644
[2,] 0.208 0.170 0.1142 0.0664 0.0917
[3,] 0.232 0.227 0.1596 0.0916 0.1031
[4,] 0.204 0.221 0.1660 0.0941 0.0799
[5,] 0.140 0.166 0.1477 0.0914 0.0532

 North-South shum.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0283 0.0165 0.0179 0.0389 0.0297
0.0225
[2,] 0.0277 0.0324 0.0175 0.0354 0.0262
0.0249
[3,] 0.0403 0.0688 0.0738 0.0762 0.0533
0.0351
[4,] 0.0577 0.1102 0.1637 0.1965 0.1644
0.1353

 NorthEast-SouthWest shum.0500
     [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.116 0.0815 0.0430 0.0303 0.0545
[2,] 0.149 0.1293 0.0757 0.0375 0.0578
[3,] 0.162 0.1832 0.1615 0.0831 0.0419
[4,] 0.160 0.2135 0.2320 0.1727 0.1018

 SouthEast-NorthWest shum.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.1004 0.0953 0.0803 0.0603 0.0549
[2,] 0.1220 0.1188 0.1119 0.0675 0.0799
[3,] 0.0999 0.0840 0.0642 0.0742 0.0902
[4,] 0.0386 0.0358 0.0608 0.1235 0.1654

 shum.0700
      [,1]  [,2]  [,3]  [,4]  [,5]  [,6]
[1,] 0.1783 0.239 0.266 0.262 0.226 0.172
[2,] 0.2062 0.283 0.332 0.336 0.274 0.201
[3,] 0.1996 0.299 0.375 0.384 0.315 0.230
[4,] 0.1389 0.236 0.321 0.346 0.298 0.220
[5,] 0.0773 0.132 0.198 0.240 0.225 0.170

 East-West shum.0700
     [,1]   [,2]   [,3]   [,4]  [,5]
[1,] 0.143 0.0784 0.0693 0.0819 0.125
[2,] 0.181 0.1166 0.0849 0.1312 0.178
[3,] 0.218 0.1752 0.1098 0.1808 0.202
[4,] 0.199 0.1715 0.1128 0.1400 0.177
[5,] 0.127 0.1325 0.0895 0.0610 0.112

 North-South shum.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.153 0.119 0.0794 0.0503 0.0271
[2,] 0.175 0.159 0.1268 0.0908 0.0451
[3,] 0.169 0.173 0.1567 0.1243 0.0683
[4,] 0.148 0.167 0.1641 0.1398 0.0838
[5,] 0.124 0.150 0.1562 0.1387 0.0899

 North-South air.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0839 0.0626 0.0298 0.0232 0.0492
0.0687
[2,] 0.0367 0.0390 0.0278 0.0243 0.0406
0.0578
[3,] 0.0381 0.0184 0.0187 0.0261 0.0353
0.0462
[4,] 0.0916 0.0647 0.0408 0.0245 0.0265
0.0328

 NorthEast-SouthWest air.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.1276 0.0958 0.0555 0.0304 0.0357
[2,] 0.1103 0.1015 0.0771 0.0449 0.0324
[3,] 0.0656 0.0821 0.0795 0.0584 0.0411
[4,] 0.0295 0.0514 0.0687 0.0639 0.0437

 SouthEast-NorthWest air.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0584 0.0717 0.0889 0.0993 0.0932
[2,] 0.1101 0.1204 0.1264 0.1203 0.0960
[3,] 0.1637 0.1642 0.1538 0.1306 0.0909
[4,] 0.1817 0.1753 0.1591 0.1294 0.0834

 shum.0500
      [,1]   [,2]  [,3]  [,4]  [,5]  [,6]
[1,] 0.0779 0.1218 0.151 0.156 0.146 0.112
[2,] 0.0717 0.1417 0.193 0.217 0.206 0.160
[3,] 0.0608 0.1451 0.223 0.277 0.273 0.226
[4,] 0.0474 0.1089 0.200 0.266 0.277 0.245
[5,] 0.0391 0.0559 0.113 0.180 0.209 0.193

 East-West shum.0500
     [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.103 0.0603 0.0217 0.0297 0.0575
[2,] 0.158 0.1084 0.0557 0.0546 0.0858
[3,] 0.201 0.1855 0.1261 0.0813 0.1051
[4,] 0.204 0.2053 0.1546 0.0949 0.0892
[5,] 0.149 0.1726 0.1485 0.0971 0.0629

 North-South shum.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0261 0.0173 0.0334 0.0690 0.0635
0.0441
[2,] 0.0408 0.0367 0.0259 0.0589 0.0624
0.0593
[3,] 0.0600 0.0719 0.0678 0.0587 0.0339
0.0252
[4,] 0.0647 0.1161 0.1553 0.1756 0.1442
0.1004

 NorthEast-SouthWest shum.0500
     [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.074 0.0325 0.0325 0.0594 0.0817
[2,] 0.120 0.0846 0.0441 0.0629 0.1003
[3,] 0.155 0.1559 0.1235 0.0658 0.0580
[4,] 0.160 0.2007 0.2064 0.1512 0.0864

 SouthEast-NorthWest shum.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0832 0.0761 0.0671 0.0530 0.0377
[2,] 0.0929 0.0907 0.0923 0.0546 0.0445
[3,] 0.0758 0.0635 0.0488 0.0543 0.0702
[4,] 0.0286 0.0338 0.0591 0.1210 0.1476

 shum.0700
      [,1]  [,2]  [,3]  [,4]  [,5]   [,6]
[1,] 0.1097 0.158 0.181 0.167 0.120 0.0731
[2,] 0.1237 0.195 0.241 0.237 0.185 0.1230
[3,] 0.1133 0.204 0.272 0.285 0.248 0.1782
[4,] 0.0819 0.162 0.241 0.280 0.262 0.2012
```

```
      [,1]   [,2]  [,3]   [,4]   [,5]
[,6]
[1,] 0.0156 0.0241 0.045 0.0761 0.0437
0.0269
[2,] 0.0496 0.0445 0.029 0.0439 0.0212
0.0239
[3,] 0.1153 0.1371 0.146 0.1335 0.0754
0.0471
[4,] 0.1193 0.1809 0.226 0.2145 0.1483
0.0947

 NorthEast-SouthWest shum.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0898 0.0532 0.0673 0.1075 0.1167
[2,] 0.1474 0.1049 0.0702 0.1148 0.1310
[3,] 0.2142 0.2122 0.1462 0.0762 0.0824
[4,] 0.2047 0.2374 0.2066 0.1211 0.0726

 SouthEast-NorthWest shum.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.1249 0.0844 0.0611 0.0575 0.0945
[2,] 0.1036 0.0869 0.0718 0.1066 0.1212
[3,] 0.0332 0.0528 0.1033 0.1893 0.1735
[4,] 0.0276 0.0841 0.1600 0.2159 0.2037

 shum.0850
      [,1]  [,2]  [,3]  [,4]  [,5]  [,6]
[1,] 0.1945 0.200 0.183 0.176 0.160 0.118
[2,] 0.2348 0.246 0.264 0.260 0.200 0.141
[3,] 0.2305 0.284 0.308 0.307 0.231 0.172
[4,] 0.1625 0.223 0.272 0.275 0.236 0.183
[5,] 0.0944 0.155 0.213 0.244 0.225 0.177

 East-West shum.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0591 0.0492 0.0378 0.0630 0.1063
[2,] 0.0792 0.0853 0.0602 0.1389 0.1462
[3,] 0.1488 0.1033 0.0825 0.1701 0.1265
[4,] 0.1292 0.0972 0.0815 0.0937 0.1101
[5,] 0.1248 0.1247 0.0741 0.0552 0.0956

 North-South shum.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0180 0.0377 0.1079 0.1100 0.0537
0.0242
[2,] 0.0422 0.0384 0.0338 0.0242 0.0225
0.0271
[3,] 0.1225 0.1414 0.1407 0.1312 0.0456
0.0359
[4,] 0.0988 0.1055 0.0959 0.0631 0.0607
0.0533

 NorthEast-SouthWest shum.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0352 0.0505 0.0863 0.1323 0.1153
[2,] 0.0769 0.0685 0.0643 0.1059 0.1202
[3,] 0.1767 0.1578 0.1090 0.0628 0.0792
[4,] 0.1419 0.1347 0.0877 0.0693 0.0837

 SouthEast-NorthWest shum.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0716 0.0961 0.0944 0.0323 0.0793
[2,] 0.0743 0.0809 0.0492 0.1294 0.0889
[3,] 0.0299 0.0671 0.1401 0.1513 0.0844
[4,] 0.0164 0.0265 0.0547 0.0694 0.0837

 dtd.0500
      [,1]  [,2]  [,3]  [,4]  [,5]  [,6]
[1,] 0.0907 0.124 0.156 0.166 0.169 0.139
[2,] 0.1250 0.175 0.209 0.222 0.215 0.163
[3,] 0.1563 0.212 0.250 0.279 0.250 0.196
[4,] 0.1481 0.201 0.246 0.267 0.233 0.191
[5,] 0.1092 0.138 0.167 0.192 0.176 0.133

 East-West dtd.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0769 0.0559 0.0256 0.0193 0.0431
[2,] 0.0874 0.0532 0.0397 0.0325 0.0997
[3,] 0.1156 0.0970 0.0625 0.0708 0.1402
[5,] 0.0410 0.086 0.145 0.196 0.209 0.1735

 East-West shum.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.109 0.0531 0.0522 0.1017 0.0925
[2,] 0.173 0.1001 0.0661 0.1049 0.1314
[3,] 0.214 0.1606 0.0962 0.1165 0.1512
[4,] 0.208 0.1850 0.1244 0.0981 0.1282
[5,] 0.143 0.1544 0.1149 0.0788 0.0728

 North-South shum.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0256 0.0399 0.0592 0.0818 0.0901
0.0649
[2,] 0.0476 0.0491 0.0337 0.0501 0.0638
0.0643
[3,] 0.0866 0.1066 0.1040 0.0772 0.0407
0.0324
[4,] 0.0932 0.1552 0.1951 0.1903 0.1348
0.0779

 NorthEast-SouthWest shum.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0682 0.0396 0.0720 0.1248 0.1239
[2,] 0.1335 0.0964 0.0606 0.0998 0.1349
[3,] 0.1851 0.1746 0.1211 0.0714 0.0912
[4,] 0.1882 0.2224 0.2004 0.1276 0.0617

 SouthEast-NorthWest shum.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.1265 0.1014 0.0486 0.0345 0.0338
[2,] 0.0996 0.0735 0.0433 0.0542 0.0525
[3,] 0.0542 0.0359 0.0505 0.0918 0.1028
[4,] 0.0271 0.0538 0.1188 0.1649 0.1743

 shum.0850
      [,1]  [,2]  [,3]  [,4]   [,5]   [,6]
[1,] 0.1524 0.153 0.136 0.121 0.0978 0.0631
[2,] 0.1913 0.196 0.200 0.199 0.1424 0.0889
[3,] 0.1923 0.228 0.259 0.265 0.1845 0.1280
[4,] 0.1471 0.202 0.245 0.242 0.2127 0.1656
[5,] 0.0768 0.135 0.190 0.223 0.2168 0.1746

 East-West shum.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0388 0.0436 0.0468 0.0615 0.0745
[2,] 0.0637 0.0525 0.0511 0.1238 0.0962
[3,] 0.1119 0.0824 0.0748 0.1583 0.0718
[4,] 0.1232 0.0711 0.0700 0.0628 0.0611
[5,] 0.1339 0.1254 0.0816 0.0571 0.0671

 North-South shum.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0197 0.0394 0.0940 0.1313 0.0798
0.0393
[2,] 0.0385 0.0414 0.0548 0.0731 0.0520
0.0593
[3,] 0.0778 0.0724 0.0877 0.1042 0.0295
0.0592
[4,] 0.1143 0.1147 0.0788 0.0464 0.0419
0.0428

 NorthEast-SouthWest shum.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0315 0.0536 0.0968 0.1323 0.1063
[2,] 0.0635 0.0536 0.0700 0.1426 0.1132
[3,] 0.1182 0.0974 0.0875 0.0620 0.0866
[4,] 0.1531 0.1218 0.0754 0.0619 0.0651

 SouthEast-NorthWest shum.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0571 0.0637 0.0733 0.0245 0.0320
[2,] 0.0643 0.0759 0.0546 0.0728 0.0321
[3,] 0.0171 0.0314 0.0895 0.0920 0.0193
[4,] 0.0262 0.0315 0.0314 0.0255 0.0463

 dtd.0500
      [,1]   [,2]  [,3]  [,4]  [,5]   [,6]
```

```
[4,] 0.1062 0.0926 0.0590 0.0681 0.1006
[5,] 0.0591 0.0639 0.0542 0.0426 0.0715

 North-South dtd.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0333 0.0345 0.0277 0.0579 0.0431
0.0151
[2,] 0.0114 0.0127 0.0377 0.0571 0.0258
0.0193
[3,] 0.0284 0.0386 0.0404 0.0529 0.0431
0.0260
[4,] 0.0765 0.1121 0.1380 0.1489 0.1126
0.0836

 NorthEast-SouthWest dtd.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0191 0.0138 0.0338 0.0470 0.0646
[2,] 0.0555 0.0351 0.0277 0.0590 0.0923
[3,] 0.0921 0.0884 0.0757 0.0393 0.0548
[4,] 0.1262 0.1493 0.1425 0.0868 0.0519

 SouthEast-NorthWest dtd.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0827 0.0606 0.0431 0.0428 0.0400
[2,] 0.0703 0.0685 0.0731 0.0330 0.0673
[3,] 0.0459 0.0311 0.0322 0.0766 0.1005
[4,] 0.0309 0.0624 0.1004 0.1459 0.1394

 dtd.0700
     [,1]  [,2]  [,3]  [,4]  [,5]   [,6]
[1,] 0.188 0.224 0.236 0.224 0.180 0.1187
[2,] 0.237 0.273 0.300 0.288 0.216 0.1420
[3,] 0.251 0.303 0.328 0.314 0.247 0.1578
[4,] 0.208 0.259 0.291 0.280 0.225 0.1420
[5,] 0.144 0.172 0.192 0.196 0.163 0.0951

 East-West dtd.0700
      [,1]   [,2]   [,3]   [,4]  [,5]
[1,] 0.0866 0.0348 0.0734 0.0821 0.110
[2,] 0.0773 0.0418 0.0644 0.1258 0.177
[3,] 0.1046 0.0725 0.0621 0.1794 0.203
[4,] 0.1118 0.0653 0.0713 0.1510 0.180
[5,] 0.0603 0.0450 0.0426 0.0809 0.130

 North-South dtd.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0523 0.0363 0.0363 0.0676 0.0408
0.0173
[2,] 0.0307 0.0299 0.0226 0.0395 0.0156
0.0153
[3,] 0.0997 0.0976 0.1005 0.1033 0.0599
0.0363
[4,] 0.1374 0.1764 0.1934 0.1704 0.1159
0.0725

 NorthEast-SouthWest dtd.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0276 0.0393 0.0809 0.1215 0.1116
[2,] 0.0766 0.0495 0.0638 0.1177 0.1331
[3,] 0.1441 0.1178 0.0826 0.0633 0.0896
[4,] 0.1779 0.1795 0.1375 0.0717 0.0617

 SouthEast-NorthWest dtd.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0976 0.0379 0.0286 0.0396 0.0857
[2,] 0.0378 0.0265 0.0352 0.0950 0.1224
[3,] 0.0230 0.0468 0.1074 0.1823 0.1593
[4,] 0.0851 0.1355 0.1842 0.2062 0.1806

 dtd.0850
     [,1]  [,2]  [,3]  [,4]   [,5]   [,6]
[1,] 0.184 0.170 0.140 0.117 0.0755 0.0377
[2,] 0.216 0.208 0.210 0.187 0.1033 0.0472
[3,] 0.219 0.237 0.226 0.200 0.1198 0.0609
[4,] 0.178 0.193 0.197 0.167 0.1189 0.0627
[5,] 0.132 0.158 0.172 0.162 0.1187 0.0576

 East-West dtd.0850
[1,] 0.0798 0.1094 0.129 0.125 0.117 0.0815
[2,] 0.0948 0.1385 0.167 0.178 0.161 0.1131
[3,] 0.1017 0.1621 0.203 0.226 0.206 0.1536
[4,] 0.0744 0.1399 0.192 0.217 0.196 0.1543
[5,] 0.0411 0.0726 0.112 0.138 0.133 0.0978

 East-West dtd.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0608 0.0327 0.0372 0.0250 0.0510
[2,] 0.0872 0.0484 0.0327 0.0496 0.0814
[3,] 0.1246 0.0903 0.0593 0.0660 0.1117
[4,] 0.1338 0.1091 0.0720 0.0673 0.0942
[5,] 0.0810 0.0863 0.0626 0.0498 0.0669

 North-South dtd.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0148 0.0227 0.0259 0.0564 0.0479
0.0276
[2,] 0.0136 0.0124 0.0312 0.0573 0.0493
0.0362
[3,] 0.0493 0.0501 0.0441 0.0424 0.0304
0.0182
[4,] 0.0665 0.1112 0.1379 0.1445 0.1201
0.0894

 NorthEast-SouthWest dtd.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0315 0.0187 0.0428 0.0601 0.0715
[2,] 0.0615 0.0377 0.0346 0.0684 0.0939
[3,] 0.1114 0.0941 0.0732 0.0401 0.0502
[4,] 0.1328 0.1557 0.1455 0.0977 0.0555

 SouthEast-NorthWest dtd.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0671 0.0488 0.0312 0.0317 0.0301
[2,] 0.0695 0.0598 0.0579 0.0361 0.0369
[3,] 0.0374 0.0235 0.0268 0.0587 0.0881
[4,] 0.0208 0.0560 0.1003 0.1419 0.1495

 dtd.0700
      [,1]  [,2]  [,3]  [,4]  [,5]   [,6]
[1,] 0.1267 0.162 0.176 0.164 0.108 0.0473
[2,] 0.1626 0.210 0.239 0.230 0.164 0.0909
[3,] 0.1707 0.235 0.277 0.259 0.211 0.1325
[4,] 0.1228 0.195 0.241 0.246 0.209 0.1392
[5,] 0.0696 0.104 0.138 0.156 0.141 0.0958

 East-West dtd.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0673 0.0310 0.0547 0.0989 0.0978
[2,] 0.1078 0.0480 0.0643 0.1057 0.1309
[3,] 0.1335 0.0739 0.0580 0.1182 0.1406
[4,] 0.1339 0.0893 0.0685 0.1016 0.1336
[5,] 0.0838 0.0703 0.0567 0.0601 0.0886

 North-South dtd.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0354 0.0575 0.0689 0.0792 0.0758
0.0529
[2,] 0.0236 0.0228 0.0221 0.0485 0.0436
0.0497
[3,] 0.0683 0.0739 0.0692 0.0511 0.0285
0.0209
[4,] 0.0949 0.1445 0.1655 0.1499 0.1126
0.0727

 NorthEast-SouthWest dtd.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0311 0.0397 0.0911 0.1296 0.1249
[2,] 0.0763 0.0482 0.0593 0.1041 0.1300
[3,] 0.1315 0.1028 0.0661 0.0618 0.0850
[4,] 0.1615 0.1704 0.1379 0.0860 0.0462

 SouthEast-NorthWest dtd.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.1056 0.0809 0.0323 0.0298 0.0363
[2,] 0.0749 0.0386 0.0273 0.0537 0.0557
[3,] 0.0211 0.0207 0.0586 0.0971 0.0963
```

```
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0395 0.0849 0.0758 0.0887 0.0922
[2,] 0.0234 0.0400 0.1002 0.1363 0.1237
[3,] 0.0253 0.0411 0.1042 0.1553 0.1131
[4,] 0.0294 0.0368 0.1060 0.1055 0.1109
[5,] 0.0408 0.0250 0.0418 0.1016 0.1178

 North-South dtd.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0280 0.0441 0.0899 0.0825 0.0452
0.0198
[2,] 0.0292 0.0297 0.0271 0.0157 0.0104
0.0248
[3,] 0.0940 0.0889 0.0868 0.0664 0.0239
0.0271
[4,] 0.0881 0.0833 0.0575 0.0295 0.0376
0.0328

 NorthEast-SouthWest dtd.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0444 0.0878 0.1210 0.1345 0.0974
[2,] 0.0325 0.0449 0.0802 0.1037 0.1108
[3,] 0.0843 0.0603 0.0408 0.0649 0.0908
[4,] 0.0852 0.0547 0.0435 0.0752 0.0811

 SouthEast-NorthWest dtd.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0163 0.0174 0.0154 0.0407 0.0603
[2,] 0.0120 0.0207 0.0736 0.1198 0.0684
[3,] 0.0728 0.1048 0.1457 0.1183 0.0605
[4,] 0.0630 0.0727 0.0810 0.0682 0.0743

 hgt.0500
     [,1]  [,2]  [,3]   [,4]   [,5]   [,6]
[1,] 0.219 0.188 0.144 0.0938 0.0475 0.0281
[2,] 0.267 0.238 0.192 0.1361 0.0788 0.0347
[3,] 0.286 0.260 0.215 0.1581 0.0983 0.0441
[4,] 0.271 0.250 0.209 0.1557 0.0990 0.0459
[5,] 0.231 0.213 0.178 0.1328 0.0840 0.0401

 East-West hgt.0500
      [,1]  [,2]  [,3]  [,4]  [,5]
[1,] 0.170 0.224 0.266 0.271 0.240
[2,] 0.163 0.239 0.299 0.316 0.290
[3,] 0.150 0.241 0.311 0.336 0.315
[4,] 0.136 0.228 0.296 0.323 0.307
[5,] 0.118 0.201 0.260 0.283 0.272

 North-South hgt.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.2909 0.2839 0.2544 0.2097 0.1583
0.1076
[2,] 0.1973 0.1961 0.1816 0.1570 0.1266
0.0941
[3,] 0.0832 0.0875 0.0885 0.0856 0.0785
0.0666
[4,] 0.0973 0.0933 0.0834 0.0713 0.0596
0.0490

 NorthEast-SouthWest hgt.0500
      [,1]   [,2]  [,3]  [,4]  [,5]
[1,] 0.2940 0.3264 0.329 0.300 0.245
[2,] 0.2292 0.2707 0.288 0.280 0.244
[3,] 0.1370 0.1828 0.214 0.220 0.201
[4,] 0.0674 0.0993 0.129 0.149 0.148

 SouthEast-NorthWest hgt.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.1773 0.1052 0.0416 0.0421 0.0524
[2,] 0.0820 0.0544 0.0708 0.0917 0.1064
[3,] 0.0726 0.1170 0.1616 0.1790 0.1734
[4,] 0.1539 0.2060 0.2330 0.2333 0.2121

 hgt.0700
     [,1]  [,2]  [,3]  [,4]  [,5]   [,6]
[1,] 0.286 0.262 0.221 0.171 0.118 0.0681
[2,] 0.319 0.299 0.260 0.206 0.148 0.0903
[3,] 0.324 0.310 0.273 0.221 0.161 0.1012
[4,] 0.0413 0.0978 0.1423 0.1659 0.1667

 dtd.0850
      [,1]  [,2]  [,3]   [,4]   [,5]   [,6]
[1,] 0.191 0.165 0.129 0.0997 0.0685 0.0267
[2,] 0.228 0.201 0.186 0.1618 0.0862 0.0334
[3,] 0.218 0.227 0.228 0.2022 0.1008 0.0578
[4,] 0.170 0.186 0.195 0.1601 0.1132 0.0756
[5,] 0.105 0.132 0.154 0.1532 0.1204 0.0725

 East-West dtd.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0515 0.0915 0.0960 0.0826 0.0815
[2,] 0.0505 0.0668 0.1008 0.1538 0.0970
[3,] 0.0348 0.0630 0.0971 0.1981 0.0568
[4,] 0.0218 0.0651 0.1085 0.0820 0.0562
[5,] 0.0470 0.0312 0.0471 0.0751 0.0988

 North-South dtd.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0553 0.0575 0.0848 0.0968 0.0353
0.0258
[2,] 0.0256 0.0389 0.0442 0.0537 0.0296
0.0439
[3,] 0.0429 0.0306 0.0424 0.0586 0.0296
0.0420
[4,] 0.1046 0.0866 0.0375 0.0353 0.0348
0.0230

 NorthEast-SouthWest dtd.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0682 0.0952 0.1261 0.1313 0.0852
[2,] 0.0452 0.0660 0.1007 0.1499 0.1010
[3,] 0.0347 0.0331 0.0376 0.0771 0.0802
[4,] 0.0901 0.0442 0.0517 0.0723 0.0666

 SouthEast-NorthWest dtd.0850
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.02300 0.0165 0.0175 0.0365 0.0471
[2,] 0.00728 0.0149 0.0362 0.1037 0.0312
[3,] 0.04021 0.0860 0.1299 0.0937 0.0173
[4,] 0.07951 0.0785 0.0486 0.0184 0.0360

 hgt.0500
     [,1]  [,2]  [,3]   [,4]   [,5]   [,6]
[1,] 0.183 0.158 0.122 0.0801 0.0378 0.0212
[2,] 0.207 0.184 0.146 0.0999 0.0513 0.0222
[3,] 0.206 0.185 0.148 0.1012 0.0513 0.0236
[4,] 0.176 0.157 0.124 0.0814 0.0375 0.0207
[5,] 0.129 0.112 0.084 0.0479 0.0269 0.0281

 East-West hgt.0500
      [,1]  [,2]  [,3]  [,4]  [,5]
[1,] 0.1319 0.195 0.239 0.240 0.205
[2,] 0.1285 0.204 0.266 0.279 0.248
[3,] 0.1206 0.197 0.264 0.284 0.258
[4,] 0.1105 0.179 0.237 0.257 0.237
[5,] 0.0996 0.157 0.200 0.215 0.199

 North-South hgt.0500
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.1899 0.1810 0.1544 0.1151 0.0691
0.0280
[2,] 0.1007 0.0953 0.0792 0.0549 0.0317
0.0218
[3,] 0.0486 0.0495 0.0484 0.0454 0.0413
0.0461
[4,] 0.1091 0.1092 0.1047 0.0968 0.0874
0.0791

 NorthEast-SouthWest hgt.0500
      [,1]   [,2]  [,3]   [,4]   [,5]
[1,] 0.2064 0.2302 0.228 0.1976 0.1465
[2,] 0.1337 0.1651 0.181 0.1703 0.1359
[3,] 0.0667 0.0886 0.105 0.1083 0.0946
[4,] 0.0485 0.0423 0.052 0.0581 0.0523

 SouthEast-NorthWest hgt.0500
```

```
[4,] 0.299 0.289 0.258 0.211 0.155 0.0971
[5,] 0.252 0.244 0.218 0.178 0.129 0.0784

 East-West hgt.0700
      [,1]  [,2]  [,3]  [,4]  [,5]
[1,] 0.1513 0.214 0.258 0.285 0.283
[2,] 0.1320 0.218 0.281 0.321 0.324
[3,] 0.1151 0.209 0.284 0.334 0.341
[4,] 0.0977 0.188 0.264 0.316 0.328
[5,] 0.0805 0.162 0.230 0.276 0.291

 North-South hgt.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.3043 0.3067 0.2853 0.2449 0.1920
0.1322
[2,] 0.2084 0.2127 0.2022 0.1786 0.1441
0.1030
[3,] 0.0965 0.1023 0.1033 0.0985 0.0867
0.0696
[4,] 0.0931 0.0943 0.0919 0.0860 0.0774
0.0667

 NorthEast-SouthWest hgt.0700
     [,1]   [,2]  [,3]  [,4]  [,5]
[1,] 0.294 0.3398 0.355 0.336 0.288
[2,] 0.221 0.2735 0.300 0.302 0.274
[3,] 0.131 0.1766 0.217 0.233 0.221
[4,] 0.074 0.0948 0.127 0.147 0.155

 SouthEast-NorthWest hgt.0700
      [,1]   [,2]   [,3]   [,4]  [,5]
[1,] 0.2157 0.1449 0.0774 0.0403 0.046
[2,] 0.1232 0.0567 0.0572 0.0731 0.106
[3,] 0.0663 0.0835 0.1287 0.1663 0.185
[4,] 0.1166 0.1763 0.2184 0.2394 0.239

 hgt.0850
     [,1]  [,2]  [,3]  [,4]  [,5]  [,6]
[1,] 0.322 0.315 0.286 0.238 0.182 0.126
[2,] 0.341 0.340 0.312 0.264 0.205 0.142
[3,] 0.338 0.340 0.315 0.270 0.213 0.149
[4,] 0.308 0.310 0.290 0.251 0.199 0.140
[5,] 0.257 0.258 0.241 0.209 0.166 0.115

 East-West hgt.0850
      [,1]  [,2]  [,3]  [,4]  [,5]
[1,] 0.0976 0.169 0.215 0.247 0.274
[2,] 0.0936 0.168 0.234 0.278 0.307
[3,] 0.0842 0.156 0.235 0.292 0.325
[4,] 0.0721 0.137 0.217 0.280 0.314
[5,] 0.0594 0.119 0.189 0.247 0.279

 North-South hgt.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.3107 0.3195 0.3051 0.2710 0.2199
0.1544
[2,] 0.2158 0.2200 0.2119 0.1923 0.1605
0.1173
[3,] 0.1054 0.1101 0.1118 0.1089 0.0987
0.0810
[4,] 0.0878 0.0929 0.0957 0.0953 0.0894
0.0779

 NorthEast-SouthWest hgt.0850
      [,1]   [,2]  [,3]  [,4]  [,5]
[1,] 0.2692 0.3337 0.370 0.364 0.321
[2,] 0.1978 0.2630 0.306 0.315 0.293
[3,] 0.1178 0.1682 0.208 0.233 0.230
[4,] 0.0803 0.0904 0.119 0.141 0.153

 SouthEast-NorthWest hgt.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.2555 0.1772 0.1058 0.0603 0.0442
[2,] 0.1685 0.0936 0.0603 0.0576 0.0865
[3,] 0.0649 0.0708 0.0863 0.1286 0.1716
[4,] 0.0789 0.1300 0.1800 0.2198 0.2406

 hgt.1000
      [,1]   [,2]   [,3]   [,4]  [,5]
[1,] 0.1116 0.0571 0.0337 0.0537 0.084
[2,] 0.0521 0.0390 0.0864 0.1232 0.138
[3,] 0.0781 0.1342 0.1750 0.1927 0.187
[4,] 0.1594 0.2023 0.2254 0.2254 0.206

 hgt.0700
     [,1]  [,2]  [,3]   [,4]   [,5]   [,6]
[1,] 0.232 0.206 0.169 0.1268 0.0840 0.0435
[2,] 0.249 0.228 0.190 0.1440 0.0951 0.0475
[3,] 0.237 0.221 0.187 0.1426 0.0928 0.0429
[4,] 0.197 0.185 0.158 0.1190 0.0736 0.0326
[5,] 0.140 0.132 0.111 0.0794 0.0420 0.0235

 East-West hgt.0700
      [,1]  [,2]  [,3]  [,4]  [,5]
[1,] 0.1272 0.192 0.244 0.256 0.233
[2,] 0.1188 0.191 0.266 0.296 0.276
[3,] 0.1004 0.170 0.255 0.299 0.289
[4,] 0.0818 0.142 0.217 0.264 0.266
[5,] 0.0679 0.116 0.173 0.213 0.222

 North-South hgt.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.1786 0.1776 0.1588 0.1264 0.0841
0.0381
[2,] 0.0884 0.0914 0.0852 0.0687 0.0437
0.0272
[3,] 0.0593 0.0584 0.0554 0.0508 0.0460
0.0427
[4,] 0.1230 0.1199 0.1120 0.1020 0.0921
0.0838

 NorthEast-SouthWest hgt.0700
      [,1]   [,2]  [,3]   [,4]   [,5]
[1,] 0.1923 0.2260 0.232 0.2078 0.1638
[2,] 0.1178 0.1556 0.183 0.1815 0.1543
[3,] 0.0576 0.0841 0.106 0.1161 0.1103
[4,] 0.0758 0.0527 0.052 0.0628 0.0659

 SouthEast-NorthWest hgt.0700
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.1147 0.0616 0.0405 0.0363 0.0756
[2,] 0.0528 0.0402 0.0672 0.1078 0.1354
[3,] 0.0674 0.1181 0.1592 0.1853 0.1931
[4,] 0.1446 0.1881 0.2175 0.2285 0.2212

 hgt.0850
     [,1]  [,2]  [,3]  [,4]   [,5]   [,6]
[1,] 0.246 0.236 0.206 0.165 0.1208 0.0765
[2,] 0.262 0.259 0.233 0.191 0.1421 0.0899
[3,] 0.245 0.248 0.227 0.190 0.1427 0.0893
[4,] 0.199 0.203 0.189 0.160 0.1190 0.0707
[5,] 0.139 0.142 0.133 0.111 0.0793 0.0400

 East-West hgt.0850
      [,1]   [,2]  [,3]  [,4]  [,5]
[1,] 0.0733 0.1376 0.185 0.225 0.239
[2,] 0.0678 0.1326 0.192 0.256 0.277
[3,] 0.0680 0.1122 0.178 0.257 0.287
[4,] 0.0600 0.0888 0.148 0.224 0.259
[5,] 0.0480 0.0702 0.119 0.177 0.213

 North-South hgt.0850
      [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.1778 0.1944 0.1948 0.1781 0.1428
0.0901
[2,] 0.0848 0.0941 0.0994 0.0956 0.0782
0.0480
[3,] 0.0665 0.0694 0.0688 0.0649 0.0584
0.0499
[4,] 0.1104 0.1164 0.1172 0.1140 0.1056
0.0926

 NorthEast-SouthWest hgt.0850
      [,1]   [,2]  [,3]   [,4]  [,5]
[1,] 0.1587 0.2301 0.273 0.2717 0.233
[2,] 0.0956 0.1446 0.189 0.2141 0.204
```

```
      [,1]  [,2]  [,3]  [,4]  [,5]  [,6]
[1,] 0.302 0.324 0.320 0.289 0.235 0.170
[2,] 0.326 0.348 0.344 0.312 0.256 0.187
[3,] 0.329 0.349 0.344 0.311 0.258 0.192
[4,] 0.304 0.320 0.313 0.284 0.238 0.180
[5,] 0.256 0.266 0.259 0.235 0.198 0.150

 East-West hgt.1000
       [,1]   [,2]  [,3]  [,4]  [,5]
[1,] 0.0946 0.1041 0.160 0.192 0.219
[2,] 0.0952 0.1137 0.170 0.210 0.247
[3,] 0.0838 0.1112 0.169 0.222 0.271
[4,] 0.0687 0.0978 0.157 0.219 0.274
[5,] 0.0549 0.0797 0.141 0.202 0.254

 North-South hgt.1000
       [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.2768 0.2895 0.2880 0.2698 0.2326
0.1759
[2,] 0.2052 0.2005 0.1912 0.1794 0.1601
0.1260
[3,] 0.1082 0.1068 0.1060 0.1058 0.1031
0.0922
[4,] 0.0834 0.0906 0.0954 0.0973 0.0942
0.0839

 NorthEast-SouthWest hgt.1000
       [,1]   [,2]  [,3]  [,4]  [,5]
[1,] 0.1812 0.2628 0.335 0.357 0.333
[2,] 0.1480 0.2098 0.272 0.301 0.297
[3,] 0.0994 0.1442 0.188 0.217 0.227
[4,] 0.0866 0.0888 0.110 0.134 0.150

 SouthEast-NorthWest hgt.1000
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.2829 0.1957 0.1094 0.0664 0.0449
[2,] 0.2110 0.1226 0.0692 0.0527 0.0665
[3,] 0.0855 0.0628 0.0671 0.0879 0.1339
[4,] 0.0639 0.0883 0.1294 0.1740 0.2148

 thickness
      [,1]  [,2]  [,3]  [,4]  [,5]  [,6]
[1,] 0.192 0.222 0.240 0.244 0.233 0.204
[2,] 0.208 0.242 0.262 0.267 0.255 0.221
[3,] 0.225 0.260 0.281 0.285 0.268 0.230
[4,] 0.227 0.260 0.279 0.280 0.260 0.220
[5,] 0.206 0.234 0.248 0.246 0.226 0.189

 East-West thickness
      [,1]   [,2]   [,3]   [,4]  [,5]
[1,] 0.160 0.0885 0.0652 0.0848 0.131
[2,] 0.170 0.1070 0.0789 0.0901 0.142
[3,] 0.154 0.1095 0.0864 0.0944 0.157
[4,] 0.131 0.0961 0.0817 0.0977 0.167
[5,] 0.109 0.0754 0.0676 0.0986 0.169

 North-South thickness
       [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.1146 0.1351 0.1548 0.1665 0.1619
0.1339
[2,] 0.1233 0.1257 0.1318 0.1355 0.1281
0.1022
[3,] 0.0932 0.0902 0.0870 0.0838 0.0786
0.0691
[4,] 0.0582 0.0695 0.0807 0.0899 0.0939
0.0900

 NorthEast-SouthWest thickness
       [,1]   [,2]   [,3]   [,4]  [,5]
[1,] 0.0456 0.0669 0.1076 0.1570 0.192
[2,] 0.0572 0.0792 0.1135 0.1540 0.191
[3,] 0.0693 0.0828 0.1059 0.1353 0.161
[4,] 0.0912 0.0906 0.0916 0.0952 0.114

 SouthEast-NorthWest thickness
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.2236 0.1797 0.1301 0.0836 0.0599
[2,] 0.2215 0.1696 0.1149 0.0729 0.0478
[3,] 0.0732 0.0746 0.109 0.1279 0.134
[4,] 0.1024 0.0806 0.067 0.0698 0.082

 SouthEast-NorthWest hgt.0850
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.1503 0.0990 0.0619 0.0436 0.0475
[2,] 0.0767 0.0541 0.0421 0.0659 0.1169
[3,] 0.0490 0.0677 0.1088 0.1519 0.1862
[4,] 0.0896 0.1327 0.1719 0.2050 0.2215

 hgt.1000
      [,1]  [,2]  [,3]  [,4]  [,5]   [,6]
[1,] 0.161 0.183 0.181 0.157 0.120 0.0807
[2,] 0.186 0.213 0.215 0.192 0.153 0.1071
[3,] 0.191 0.220 0.225 0.205 0.167 0.1191
[4,] 0.171 0.195 0.200 0.185 0.152 0.1081
[5,] 0.132 0.145 0.149 0.138 0.113 0.0763

 East-West hgt.1000
       [,1]   [,2]   [,3]  [,4]  [,5]
[1,] 0.0829 0.0604 0.0944 0.112 0.143
[2,] 0.1031 0.0671 0.0894 0.113 0.163
[3,] 0.1024 0.0686 0.0789 0.112 0.178
[4,] 0.0893 0.0617 0.0702 0.112 0.178
[5,] 0.0697 0.0473 0.0635 0.108 0.166

 North-South hgt.1000
       [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.1274 0.1604 0.1871 0.1938 0.1773
0.1381
[2,] 0.0918 0.0964 0.1083 0.1204 0.1203
0.0944
[3,] 0.0575 0.0623 0.0663 0.0684 0.0661
0.0546
[4,] 0.0640 0.0773 0.0878 0.0967 0.1009
0.0944

 NorthEast-SouthWest hgt.1000
       [,1]   [,2]   [,3]   [,4]  [,5]
[1,] 0.0661 0.1243 0.1797 0.2078 0.206
[2,] 0.0621 0.0989 0.1424 0.1717 0.190
[3,] 0.0748 0.0742 0.1002 0.1303 0.138
[4,] 0.1045 0.0934 0.0825 0.0766 0.094

 SouthEast-NorthWest hgt.1000
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.1984 0.1293 0.0793 0.0557 0.0364
[2,] 0.1459 0.0835 0.0530 0.0388 0.0471
[3,] 0.0628 0.0466 0.0436 0.0618 0.1221
[4,] 0.0418 0.0518 0.0850 0.1319 0.1867

 thickness
       [,1]  [,2]  [,3]  [,4]  [,5]   [,6]
[1,] 0.0813 0.103 0.114 0.114 0.107 0.0902
[2,] 0.0794 0.108 0.126 0.134 0.130 0.1134
[3,] 0.0768 0.110 0.136 0.150 0.149 0.1299
[4,] 0.0786 0.108 0.136 0.153 0.152 0.1315
[5,] 0.0780 0.101 0.122 0.137 0.135 0.1149

 East-West thickness
      [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.108 0.0507 0.0455 0.0556 0.0741
[2,] 0.138 0.0819 0.0585 0.0495 0.0754
[3,] 0.154 0.1104 0.0748 0.0554 0.0836
[4,] 0.161 0.1264 0.0867 0.0570 0.0922
[5,] 0.156 0.1283 0.0834 0.0513 0.0946

 North-South thickness
       [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0367 0.0537 0.0786 0.1106 0.1253
0.1184
[2,] 0.0434 0.0499 0.0726 0.0923 0.1040
0.0935
[3,] 0.0440 0.0495 0.0592 0.0733 0.0755
0.0624
[4,] 0.0436 0.0528 0.0593 0.0651 0.0689
0.0648
```

```
[3,] 0.1604 0.1122 0.0709 0.0482 0.0773
[4,] 0.0688 0.0544 0.0586 0.0938 0.1635

 6h.totaltotals
      [,1]  [,2]  [,3]   [,4]   [,5]   [,6]
[1,] 0.164 0.161 0.127 0.0858 0.0417 0.0388
[2,] 0.208 0.202 0.186 0.1413 0.0638 0.0382
[3,] 0.212 0.229 0.211 0.1653 0.0866 0.0484
[4,] 0.180 0.190 0.182 0.1382 0.0959 0.0559
[5,] 0.134 0.148 0.153 0.1390 0.1117 0.0704

 East-West 6h.totaltotals
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0308 0.0751 0.0990 0.1039 0.0804
[2,] 0.0401 0.0561 0.1259 0.1363 0.0952
[3,] 0.0387 0.0576 0.1214 0.1515 0.0726
[4,] 0.0264 0.0493 0.1140 0.0844 0.0795
[5,] 0.0232 0.0216 0.0383 0.0675 0.0799

 North-South 6h.totaltotals
       [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0282 0.0528 0.0772 0.0666 0.0519
0.0330
[2,] 0.0242 0.0301 0.0293 0.0227 0.0277
0.0494
[3,] 0.0700 0.0781 0.0811 0.0525 0.0310
0.0442
[4,] 0.0656 0.0646 0.0354 0.0480 0.0593
0.0555

 NorthEast-SouthWest 6h.totaltotals
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0309 0.0912 0.1324 0.1419 0.0935
[2,] 0.0401 0.0511 0.1041 0.1170 0.1042
[3,] 0.0738 0.0513 0.0560 0.0712 0.0737
[4,] 0.0634 0.0376 0.0599 0.0814 0.0856

 SouthEast-NorthWest 6h.totaltotals
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0452 0.0243 0.0240 0.0483 0.0314
[2,] 0.0244 0.0360 0.0874 0.0963 0.0291
[3,] 0.0477 0.1139 0.1508 0.0984 0.0405
[4,] 0.0459 0.0617 0.0564 0.0333 0.0428

 NorthEast-SouthWest thickness
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0666 0.0443 0.0716 0.0934 0.1200
[2,] 0.0810 0.0601 0.0611 0.0891 0.1124
[3,] 0.0939 0.0824 0.0673 0.0768 0.1024
[4,] 0.1197 0.1097 0.0970 0.0728 0.0791

 SouthEast-NorthWest thickness
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.1304 0.1044 0.0932 0.0846 0.0545
[2,] 0.1360 0.1147 0.0996 0.0773 0.0343
[3,] 0.1178 0.0997 0.0772 0.0414 0.0383
[4,] 0.0757 0.0571 0.0400 0.0380 0.1011

 6h.totaltotals
       [,1]  [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.1168 0.117 0.0909 0.0481 0.0224
0.0329
[2,] 0.1494 0.142 0.1332 0.1106 0.0486
0.0295
[3,] 0.1457 0.158 0.1706 0.1676 0.0879
0.0477
[4,] 0.1200 0.138 0.1516 0.1313 0.0966
0.0697
[5,] 0.0806 0.099 0.1129 0.1153 0.0992
0.0656

 East-West 6h.totaltotals
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0330 0.0685 0.0942 0.0765 0.0565
[2,] 0.0364 0.0451 0.0793 0.1302 0.0636
[3,] 0.0276 0.0361 0.0610 0.1701 0.0317
[4,] 0.0213 0.0466 0.0766 0.0497 0.0256
[5,] 0.0294 0.0244 0.0311 0.0465 0.0647

 North-South 6h.totaltotals
       [,1]   [,2]   [,3]   [,4]   [,5]
[,6]
[1,] 0.0321 0.0443 0.0686 0.1050 0.0690
0.0391
[2,] 0.0233 0.0222 0.0333 0.0964 0.0651
0.0626
[3,] 0.0191 0.0203 0.0371 0.0719 0.0329
0.0453
[4,] 0.0516 0.0407 0.0246 0.0419 0.0381
0.0250

 NorthEast-SouthWest 6h.totaltotals
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0368 0.0753 0.1173 0.1267 0.0850
[2,] 0.0271 0.0452 0.0888 0.1555 0.0915
[3,] 0.0256 0.0295 0.0428 0.0653 0.0510
[4,] 0.0491 0.0268 0.0475 0.0588 0.0474

 SouthEast-NorthWest 6h.totaltotals
       [,1]   [,2]   [,3]   [,4]   [,5]
[1,] 0.0424 0.0193 0.0212 0.0173 0.0140
[2,] 0.0326 0.0163 0.0255 0.0570 0.0185
[3,] 0.0134 0.0483 0.0917 0.0784 0.0161
[4,] 0.0319 0.0251 0.0239 0.0202 0.0161
```