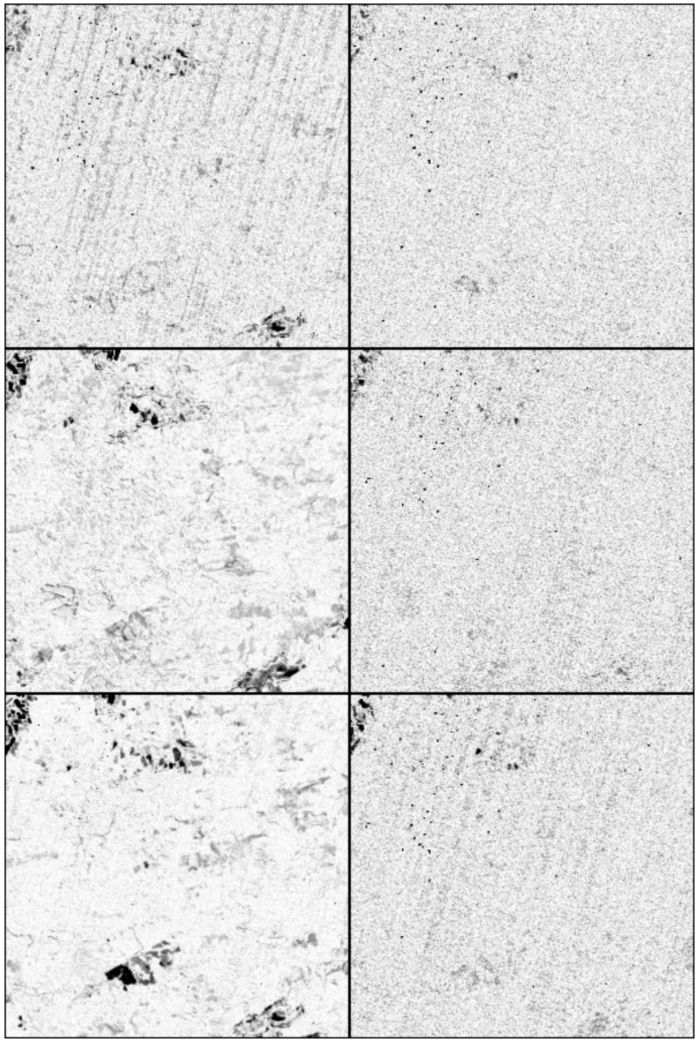

Figure 3.24: Absolute values of MAFs of Q-mode canonical variates 6

related with TM4, possibly vegetation changes. For completeness Figure 3.25 gives correlations between R-mode CVs 1 and the original data.

For reasons given in the above paragraph Section 3.3.3 contains a brief report on a MAD analysis of the bi-temporal data from 1986 and 1988.

Figure 3.29 shows the sum of the absolute values of MAFs 1 and 2 of the Q-mode canonical variates 6. The dark areas in this one image are areas of maximum change in all years and all bands regardless of what caused the change and regardless of the "direction" of change.

The following comparisons between R- and Q-mode canonical variates of the above data all refer to constraint and orthogonality criterion $\boldsymbol{a}_i^T \boldsymbol{\Sigma}_{ii} \boldsymbol{a}_i = 1$, i.e. each canonical variate has unit variance (constraint 3 above). Table 3.11 shows correlations between R-mode canonical variates 1 ($\boldsymbol{\Sigma}_U$) for all methods investigated. The same correlations for Q-mode analysis is shown in Table 3.12. Again, we see a special behavior for TM4 indicating vegetation changes.

In these comparisons, Sumcor, Ssqcor and Maxvar seem to perform much in the same fashion. Minvar and Genvar seem to perform differently and not in the same fashion. Gnanadesikan (1977) observes a similar different behavior for Minvar. This is understandable when contemplating the design criteria behind the individual methods. Sumcor and Ssqcor both focus on all correlations between CVs. Maxvar maximizes the largest eigenvalue, again a focus on all elements in $\boldsymbol{\Sigma}_U$. Minvar relies heavily on the smallest eigenvalue, whereas Genvar minimizes the determinant of $\boldsymbol{\Sigma}_U$ and therefore relies on several small eigenvalues. Due to lack of ground truth data it has not been possible to determine empirically which of the five methods (if any) perform best in this context.

Tables 3.13 and 3.14 show comparisons of the actual values of the optimization criteria for the five methods discussed for R- and Q-mode canonical variates 1. The optimization criteria are not contradicted, e.g. for Minvar λ_{min} is smaller than for the other methods. Also in this comparison, Sumcor, Ssqcor and Maxvar seem to perform much in the same fashion, and Minvar and Genvar seem to perform differently and not in the same fashion.