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For a transformation T , the usual ergodic averages $A_n f = \frac{1}{n} \sum_{k=1}^n f \circ T^k$ are now known to have properties that do not necessarily hold for the general convergent stochastic process. Some of these properties are seen to hold by studying square functions of the differences $D_{n,m} f = A_n f - A_m f$. We study the square function $Sf = \left(\sum_{k=1}^{\infty} |D_{n_k, n_{k+1}} f|^2 \right)^{1/2}$ for a fixed subsequence (n_k) . This operator is bounded from L_{∞} to BMO , but not generally from L_{∞} to L_{∞} . The latter property depends on the sequence (n_k) . Related issues in one variable, and similar concerns for multivariable averages, are a developing area of study in ergodic theory. (Received August 08, 2006)