L^p-parabolic regularity and non-degenerate Ornstein-Uhlenbeck type operators

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We prove L^p-parabolic a-priori estimates for $\partial_t u + \sum_{i,j=1}^d c_{ij}(t)\partial^2_{x_i x_j} u = f$ on R^{d+1} when the coefficients c_{ij} are locally bounded functions on R and $p \in (1, \infty)$. We slightly generalize the usual parabolicity assumption and show that still L^p-estimates hold for the second spatial derivatives of u. We also investigate the dependence of the constant appearing in such estimates from the parabolicity constant. When $p \neq 2$ the proof requires the use of the stochastic integral. Finally we extend our estimates to parabolic equations involving non-degenerate Ornstein-Uhlenbeck type operators.