Partial reconstruction of a source term in a linear parabolic problem

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We consider an abstract inverse problem of the form

$$\begin{cases} D_t u(t,x,y) = A(t,x,D_x)u(t,x,y) + B(t,y,D_y)u(t,x,y) + g(t,x)f(t,x,y), \\ (t,x,y) \in [0,T] \times \mathbf{R}^m \times \mathbf{R}^n, \\ u(0,x,y) = u_0(x,y), \qquad (x,y) \in \mathbf{R}^m \times \mathbf{R}^n, \\ u(t,x,0) = \phi(t,x), \qquad (t,x) \in [0,T] \times \mathbf{R}^m, \end{cases} \tag{1}$$

with u and g unknown. A and B are strongly elliptic operators of order $2p$, in $\mathbf{R}^m$ and $\mathbf{R}^n$ respectively. The last equation in (0.1) provides the further information, which is necessary to identify u together with g. Under suitable assumptions, we are able to prove a result of existence and uniqueness of a global solution.