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We discuss the iterative solution of a finite element discretisation of magma dynamics equations. These equations share features of the Stokes equations which could motivate the use of Elman-Silvester-Wathen (ESW) preconditioners. The ESW preconditioners, however, are less effective for the magma dynamics equations [1]. For this reason we developed a new preconditioner. This was done by introducing a new unknown, the compaction pressure, into the magma dynamics equations. The original  $2 \times 2$  block system is therefore expanded to a  $3 \times 3$  block system in such a way that problematic terms of the  $2 \times 2$  block system are removed. For this  $3 \times 3$  block system we developed, analysed and tested a new three-field preconditioner [2] which is optimal in terms of problem size and less sensitive to physical parameters compared to the ESW preconditioners.

[1] S. Rhebergen, G.N. Wells, R.F. Katz and A.J. Wathen, Analysis of block-preconditioners for models of coupled magma/mantle dynamics, *SIAM J. Sci. Comput.*, 36 (2014), pp A1960-A1977.

[2] S. Rhebergen, G. N. Wells, A. J. Wathen and R. F. Katz, Optimal three-field block-preconditioners for models of coupled magma/mantle dynamics, arXiv:1411.5235 (2014).