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二维应变速率正演模拟

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摘要 由给定的随时间和空间变化的二维应变速率分布计算速度场，根据速度场计算二维热传导方程，得到岩石圈的热演化结构，然后计算由热扰动引起的密度变化，进而确定加载到岩石圈上的载荷，根据载荷计算挠曲方程，最终得到盆地的沉降.在此基础上讨论了热源对地表热流和沉降的影响以及岩石圈有效弹性厚度对盆地几何形态的影响.结果表明，热源对地表热流影响显著，对沉降影响不大，岩石圈有效弹性厚度则控制盆地的几何形态.二维应变速率正演为下一步的反演奠定了基础.

关键词 应变速率 沉降 热源 地表热流 有效弹性厚度

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2-D strain rate forward modeling

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Abstract Given the variation of two-dimensional strain rate through space and time, the velocity field is calculated. This velocity field determines the evolving thermal structure of the lithosphere. The temperature structure constrains the changing density structure which defines the loading history. Finally, subsidence history is calculated by solving the flexural equation with the imposing loads. Based on the forward modeling, we analyze the effects of heat source on surface heat flow and subsidence and study how the lithospheric effective elastic thickness affects the geometry of rifted basins. The results indicate that heat source has significant effect on surface heat flow but has little impact on subsidence. The lithospheric effective elastic thickness controls the geometry of rifted basins. The forward modeling provides a good foundation for the inversion of 2D strain rate.

Key words Strain rate; Subsidence; Heat source; Surface heat flow; Effective elastic thickness

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