Local Volatility Calibration in Commodity Markets

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We introduce a local volatility model for the valuation of options on commodity futures by using European vanilla option prices. The corresponding calibration problem is addressed within an online framework, allowing the use of multiple price surfaces. Since uncertainty in the observation of the underlying future prices translates to uncertainty in data locations, we propose a model-based adjustment of such prices that improves reconstructions and smile adherence. In order to tackle the ill-posedness of the calibration problem we incorporate a priori information through a judiciously designed Tikhonov-type regularization. Extensive empirical tests with market as well as synthetic data are used to demonstrate the effectiveness of the methodology and algorithms.