

# Coal Mining Subsidence and its Effects on Agricultural Land: a UAV-Based Investigation in Eastern China<sup>1</sup>

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**Abstract:** China produces and consumes nearly half of the global coal production, of which more than 85% comes from underground mining. The exploitation of coal reserves brings lot of negative impact and land and environment, mining induced subsidence were the most serious issues in China. To investigate the impacts of mining subsidence on agricultural land in eastern China, a high ground water table plain, a field survey covers soil and maize biochemical vegetation parameters are carried out, which includes soil moisture N, P, K content, maize chlorophyll, leaf area index (LAI), and biomass. Furthermore, multi-spectral and visible sensors are mounted on an unmanned aerial vehicle (UAV) based platform to monitoring geomorphology and maize biochemical vegetation parameters. Inversion models were constructed using empirical modelling methods; the remote sensing inversion models of chlorophyll, LAI, and biomass were built, validated, and compared. Finally, the spatial distribution of those indicators was analyzed to delineate the boundary of mining subsidence on agricultural land. The chlorophyll, LAI, and biomass content gradually decreased from the edge of the subsidence basin to the center, which indicated a significant impact of mining induced terrain alternation and effects on agricultural land. The proposed method provides highly efficient, immediate, and accurate references for mining damage assessment, and could guide subsequent subsided land reclamation and ecological restoration<sup>3</sup>.

**Additional Key Words:** High ground water table; multi-spectral; remote sensing

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3. Work reported here was conducted near 35°29'55"N, 116°55' 03"E.