

Remote Sensing in Optical and Microwave Region for Detecting Coal Mining Induced Subsidence

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Coal is often present in multiple seams and is mined from depths by manual room and pillar method or by longwall mining. Longwall mining is more mechanised and results in controlled and predictable subsidence. Mining by room and pillar method involves partial excavation of underground coal seams creating a voids or goafs between the remaining unmined coal bodies which form the supporting pillars. If these goafs are not filled or stowed with some filling material, they leave the area above them very prone to land subsidence. Unfilled or partially filled goafs in old working, extraction of coal seams below already worked seams and presence of underground coal fires are all inevitable causes of land subsidence. The subsidence can range from sudden collapse of local extent to a gradual collapse spanning large areas. Though predicting such subsidence is difficult, some speculations can be made on the subsidence prone areas by combining information on the geology of the area, mining practices, old mine working plans and local knowledge of the area. This paper presents an overview of subsidence in coal mining areas, addressing the causes, effects and preventive measures of subsidence related problems. The use of traditional surveying techniques, remote sensing in optical wavelength and the use of SAR Interferometry techniques for subsidence mapping are discussed and the results of using these tools in a coal mining area in India and China are presented. The paper concludes with some useful recommendations and thoughts for future research in this direction.