

Progresses and Frontiers of Mathematical Geosciences

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In this presentation I will review the progresses and the frontiers of Mathematical Geosciences (MG) from a viewpoint of MG as an interdisciplinary subject of earth sciences. The major progresses of MG are marked by several milestones including but limited to from mathematical geology and statistical geology to a more broad subject of mathematical geosciences and from a field of applications of mathematics and computers in geology to a matured and indispensable interdisciplinary science discipline that studies mathematical characteristics and geological processes of the Earth (other planets), as well as quantitative prediction and evaluation of earth resources and environment including geohazards. Together with other geoscience disciplines MG plays an indispensable role in studying the evolution of the livable earth, predicting and evaluating various extreme geological events, and serving the sustainable development of society. Mathematical geoscientists have made and will continue to make important contributions to the establishment of the modern earth system science and the development of innovative theories and methods to meet the major needs of mankind. Many topics of MG including big data analytics, artificial intelligence and geocomplexity theory are examples reflecting the Earth science frontiers in the 21st century. With supports of digital revolution Earth Science moves from simple to complex, from local to global, from description to mechanism, from qualitative to quantitative, and from modeling to prediction. From this regards Mathematical Geosciences is an emerging discipline full of hopes and prospects. It welcomes and encourages young talents including school and university students to integrating mathematics and geosciences and to devoting them to the MG.