



## A Dynamical System for the Earth's Ionosphere—Space Weather through Complex System Science

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### Message from the Guest Editor

All over Physics, modelling a system is trying to predict its evolution, and this is where Dynamics comes into the play. Then, modelling a physical system is representing it as a Dynamical System. This all is applicable to the Earth's ionosphere too: indeed, one of the most fundamental issues of ionospheric modelling is constructing dynamical models to predict the behaviour of the Earth's ionospheric region. Writing a Dynamical System for a region of the Earth's ionosphere is complicated. Many branches of physical sciences must hence be involved: particle and fluid mechanics, electromagnetism, chemistry and (non-equilibrium) thermodynamics, and this all renders the task of writing “simple” dynamical models extremely difficult in principle.

This Special Issue is an attempt to collect new and updated examples of ionospheric global or local models based on Dynamical System Theory. In particular, submissions are encouraged about ionospheric applications of (but not limited to):

- non-equilibrium thermodynamics,
- chaos theory,
- complex systems,
- artificial intelligence and neural networks,
- stochastic dynamics.





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## Message from the Editor-in-Chief

Continued developments in instrumentation and modeling have driven atmospheric science to become increasingly more complex with a deeper understanding of concepts, mechanisms, and interactions. This is the field that innovation built and it has led to a better appreciation for the complexity with atmosphere. Human life is intertwined in this complexity as we strive to better understand our atmosphere. Climate change is constantly stretching the limits of our thinking and forcing new ideas and concepts to be played out. Welcome to the Anthropocene!

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