# MUSICActivities

## NCAR Newsletter

*Of the Multiscale Infrastructure for Chemistry and Aerosols*

MUSICA – the Multi-Scale Infrastructure for Chemistry and Aerosols – will become a computationally feasible global modeling framework that allows for the simulation of large-scale atmospheric phenomena, while still resolving chemistry at emission and exposure relevant scales (down to ~4 km within the next 5 years). MUSICA will eventually replace and extend the current separate community chemistry modeling efforts at NCAR (e.g. WACCM, CAM-Chem, WRF-Chem), paralleling other activities at NCAR to streamline and unify model development.

## Summary

In this issue of our newsletter you will find information on:

- MUSICA presentations at the AGU 2021 Fall Meeting

- Links to MUSICAv0 and MusicBox models and output

- MUSICA tutorial series

- Upcoming meetings

- Job advertisements

**MUSICAv0** is an initial configuration based on the CESM Community Atmosphere Model with chemistry (CAM-chem) using the Spectral Element (SE) with Regional Refinement (RR) dynamical core.

**MusicBox** is a box model using a model independent chemistry module.

**MELODIES** is a modular framework to compare model results and observations of atmospheric chemistry.

*To contribute to the newsletter, please email alma@ucar.edu*

# MUSICA Science

## AGU 2021 Fall Meeting

L. Emmons (NCAR): Simulating Local-scale Air Quality with the Global Model MUSICA *https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/834724*

W. Tang (NCAR): Effects of fire diurnal variation and plume injection on U.S. air quality during FIREX-AQ based on the Multi-Scale Infrastructure for Chemistry and Aerosols (MUSICA-V0)
https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/960318

R. Buchholz (NCAR): Developing Multi-scale Modeling Over Australia for the 2019/2020 Extreme Wildfire Season
*https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/869219*

B. Roozitalab (U. Iowa; ACOM Ralph Cicerone graduate student fellow): Studying air quality in India using the multi-scale MUSICA-v0 model
*https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/958870*

N. Mariscal (Wayne State UniversityEvaluations of Model Simulated Ozone and its Precursors in MUSICA-V0 Against In-situ and Airborne Measurements over the Continental US *https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/959718*
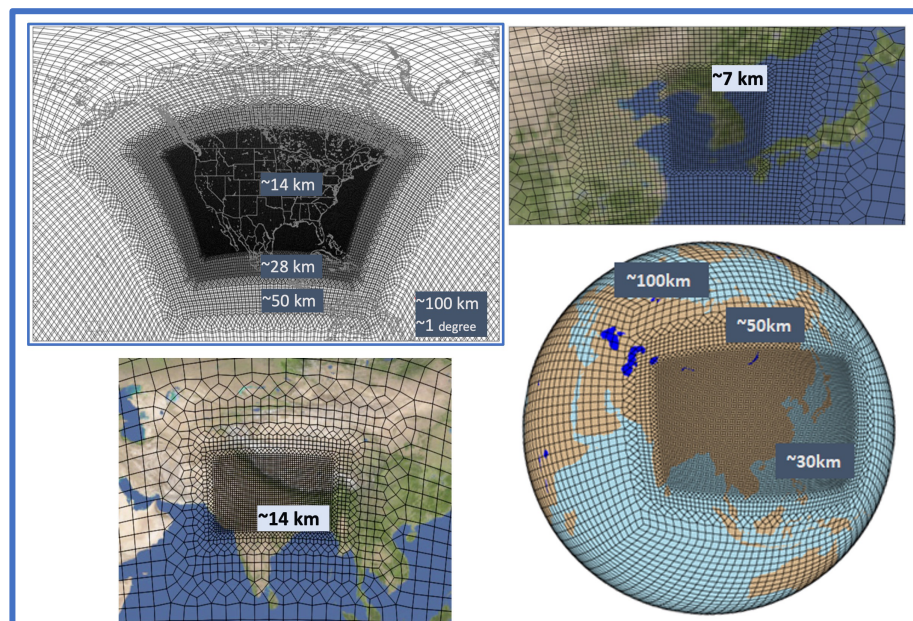
# MUSICA Developments

- ## MusicBox

  MusicBox is available as a terminal-based, command line version and as an interactive version with a browser interface. The interactive version has three example chemical mechanisms for getting started. For information on how to access and use MusicBox, please go to the MusicBox github site.

  *https://github.com/NCAR/music-box*

- ## MUSICAv0 is now available for the community

  MUSICAv0 has been released as a configuration of CAM-chem in CESM2.2.0, with a refined grid over the continental U.S. Guidance on getting started running MUSICAv0 is available on the MUSICA wiki page:

  *https://wiki.ucar.edu/display/MUSICA/MUSICA+Home*

  Output from a simulation of MUSICAv0 is available for 2012-2013 at:
  *https://sima.ucar.edu/simulations/chemistry/*

## MUSICA Online Tutorial Series

- Presentation slides and video are available for the November 12 and December 10 sessions.

  *https://www2.acom.ucar.edu/workshop/musica-tutorial-2021*

- November 12: How to use MUSICAv0 output
- December 10: How to run MUSICAv0
- **January 14: How to create your own variable resolution grid**
- **February 11: How to run MELODIES**
- March 11: How to use MusicBox

Please let us know of other topics you are interested in learning about

# Upcoming Meetings

## CESM Working Groups Winter Meeting

- The CESM Atmosphere, Chemistry and Whole Atmosphere working groups winter meeting will be the **week of February 7, 2022** and will include discussion and presentations on MUSICA. For more information and to register to attend and present, see https://www.cesm.ucar.edu/events/wg-meetings/2022/.

## Aerosol Interfaces – virtual Workshop

- Natalie Mahowald (Cornell U.), Alma Hodzic (NCAR), and several others are organizing a workshop to develop a general set of requirements for aerosol-chemistry interfaces within weather and climate models that will take place on **Wednesday February 16 from 12-3 pm Eastern US Time**. If you are interested in attending or contributing to, please register here and answer these questions: https://docs.google.com/forms/d/1KcuZxhOTukPfNoRQ1xIY6eWs35fDQODy0-eM1S2SsvE/edit?ts=61aa1b1e

## Workshop on Ozone Dry Deposition

- Olivia Clifton (NASA GISS), Arlene Fiore (MIT) and Louisa Emmons (NCAR) are organizing a virtual workshop on ozone dry deposition to be held on **March 28 & 30**. This workshop will build on the first workshop in October 2017 (https://atmoschem.ldeo.columbia.edu/ozone-drydep-workshop/) and the resulting review paper (https://doi.org/10.1029/2019RG000670). This second workshop aims to:

  1) identify recent advances in incorporating process understanding of ozone dry deposition into local-to-global models

  2) establish future priorities for modeling ozone dry deposition on multiple scales.

  A workshop deliverable will be to develop recommendations for representation of ozone dry deposition in MUSICA.

  If you are interested, please complete this form to provide feedback on our current plan for scope and structure: https://forms.gle/SSqcj3KEbR6oFAKVA.

# Job Advertisements

## Software Engineers to contribute to MUSICA

Currently we have job advertisements for the following positions:

- **Software Engineer II/III/IV** in Atmospheric Chemistry Observations and Modeling Laboratory to support new and ongoing software development using contemporary software design and testing strategies.
  https://ucar.wd5.myworkdayjobs.com/en-US/UCAR_Careers/job/Foothills-Lab-0/Software-Engineer-II-III-IV--atmospheric-chemistry_REQ-2021-365-1

- **One-year term for a Student Assistant** in Computer Science in the Atmospheric Chemistry Observations and Modeling Laboratory to implement new features of the graphical user interface of the chemical box model MusicBox.
  https://ucar.wd5.myworkdayjobs.com/en-US/UCAR_Careers/job/Foothills-Lab-0/Student-Assistan-Intern--1-year-position_REQ-2021-367-1

- **Six-month term for a Student Assistant/Intern** in Computer Science in the Atmospheric Chemistry Observations and Modeling Laboratory to implement a graph-network visualization of mass flux through chemical mechanisms for the chemical box model MusicBox.
  https://ucar.wd5.myworkdayjobs.com/en-US/UCAR_Careers/job/Foothills-Lab-0/Student-Assistant-Intern---Computer-Science_REQ-2021-366-1

We would prefer for the software engineer and students to work at NCAR in Boulder but will consider remote work options. ***Deadline to apply is January 20, 2022.***

If you have a job position to advertise in the MUSICA newsletter, please let us know by contacting alma@ucar.edu

*More information can be found at the MUSICA web page:*
*https://www2.acom.ucar.edu/sections/multi-scale-chemistry-modeling-musica*