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## Automated detection and classification of synoptic scale fronts from atmospheric data grids

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Automatic determination of fronts from atmospheric data is an important task for weather prediction as well as for research of synoptic scale phenomena. We developed a deep neural network to detect and classify fronts from multi-level ERA5 reanalysis data. Model training and prediction is evaluated using two different regions covering Europe and North America with data from two weather services. Due to a label deformation step performed during training we are able to directly generate frontal lines with no further thinning during post processing. Our network compares well against the weather service labels with a Critical Success Index higher than 66.9% and a Object Detection Rate of more than 77.3%. Additionally the frontal climatologies generated from our networks output are highly correlated (greater than 77.2%) to climatologies created from weather service data. Evaluation of cross sections of our detection results provide further insight in the characteristics of our predicted fronts and show that our networks classification is physically plausible.