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Sixty years of atmospheric research at Mace Head and counting – highlights and future challenges

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Global climate change has led to the increased interest and the eventual importance of long-running research infrastructures like Mace Head where atmospheric aerosol research started sixty years ago back in 1957 with the observations of the smallest particle nuclei forming in clean air. Mace Head has grown from a little shelter to a world renowned WMO Global Atmosphere Watch station with a cutting edge research. A number of long- lasting observational programmes like AGAGE, EMEP or Global Carbon Monitoring network to name a few have been supported over the years. Mace Head research infrastructure provides all essential climate variables on 24/7 basis having uninterrupted record of 25+ years. Mace Head is the ideal geographical location on the west coast of Ireland exposed to the vast North Atlantic Ocean and the cleanest maritime air masses advected to continental Europe with unperturbed background air. The excellence of research performed at Mace Head has resulted in a number of Nature papers and close to 600 peer-review papers in total. EPA Ireland and Met Eireann have been dedicated investors into research conducted at Mace Head with a great return of top quality publications and public reports. A breakthrough in aerosol research has been made with PRTLI strategic investment 10 years ago when boundary layer remote sensing measurements were established alongside with the real-time chemical composition measurements by Aerosol Mass Spectrometer. The challenges remain in sustaining the expanded Mace Head Observatory and its continuing upgrade to withstand future storms.