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**Press releases 2008**

**DLR's Falcon research aircraft deployed to improve typhoon forecasts**

*13 October 2008*



Falcon D-CMET flying over the typhoon

**Six-week measurement campaign completed successfully**

From on board the Falcon D-CMET research aircraft of the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR), atmospheric researchers have explored the typhoons Sinlaku and Jangmi at very close quarters as they swept across Taiwan and China. The goal of their data-gathering flights is improved forecasting of tropical cyclones. The six-week international measurement campaign was completed successfully on 1 October 2008.

**Measuring probes transmitted data from inside the typhoon**

"These flights were quite stressful for us because the strong updraughts that kept developing in the vicinity of the storm forced us to make last-minute adjustments to the flight plans. We were able to avoid all thunderstorm cells and all situations which could endanger the aircraft, however", says Dr Martin Weissman of the DLR Institute for Atmospheric Physics (DLR-Institut für Physik der Atmosphäre), speaking about the measurement campaign. In addition to the Falcon, between 23 August and 1 October 2008 a Taiwanese and two American research aircraft took off from the American military base US Naval Air Facility Atsugi in Japan on over 80 data-gathering flights in the context of the THORPEX project (The Observing System Research and Predictability Experiment).

A drop probe is released from the Falcon D-CMET

For the first time, the life cycle of a typhoon was documented over a period of almost two weeks by airborne observations. The researchers tracked the typhoon Sinlaku from the early stages in the tropics until the moment it came under the influence of the atmosphere in the mid-latitudes. One of the methods used by the researchers was to release measuring probes while flying over the typhoon. These probes were capable of measuring wind speed, water vapour, temperature and humidity directly inside the typhoon, transmitting the data in real time to all weather services via a satellite telephone connection. The measurement campaign, which brought together North American, Asian and European researchers, offered a unique opportunity to gain a better understanding of typhoons and to considerably improve typhoon forecasts.



Falcon D-CMET in action

### Laser measurement of wind and water vapour profiles

In addition to this, the researchers used so-called lidar instruments (Light Detection and Ranging) developed at the DLR Institute for Atmospheric Physics and unique in the world. These instruments use lasers to measure high-resolution wind and water vapour profiles in the atmosphere. Based on the data obtained in this measurement campaign, decisions will be made with regard to the application of future operational instruments in satellites or airliners. Atmospheric researchers expect that such measurements will turn out to be significantly more useful for numerical weather prediction than conventional measurements.



Flying for research in Japan: the crew in front of the Falcon D-CMET

Sinlaku, the typhoon observed in this project, reached a peak intensity of Category 4, shortly before landfall in Taiwan where it caused severe flooding in the capital Taipei. The typhoon proceeded to brush past the eastern coast of Japan, passing over the Falcon which was stationed near Tokyo at the time, before its transition to an extratropical low-pressure system east of Japan. Typhoon Jangmi even reached super typhoon status. Taiwan was hard hit by this storm as well. After sweeping across Taiwan, Jangmi proceeded to brush past the Chinese coast, weakening considerably in the process. By the time it reached Japan, it had evolved into a relative weak storm.

### International cooperation spanning three continents



Typhoon clouds over the US Naval Air Facility Atsugi in Japan

During the measurement campaign, 14 scientists and engineers as well as aircrew personnel of the DLR Institute for Atmospheric Physics and DLR's Oberpfaffenhofen flight facility were based in Japan for six weeks. It was the largest flight campaign to be organised by the institute in several years. It was hardly a straightforward one for the research teams: The fact that civilian research aircraft were taking off from an American military base made the approval procedures required by the Asian authorities very complex.

The research was conducted in the context of the THORPEX Pacific Asian Regional Campaign, which itself forms part of a ten-year research programme of the World Meteorological Organization (WMO). The deployment of the Falcon was funded by DLR and Forschungszentrum Karlsruhe, as well as other institutions from the US, Canada, Japan, Korea and Europe.

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