COPS Weather Summary – UPDATE 12 August 2007

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Amendment

Latest satellite imagery shows a mid/upper-level cloud band which is associated with DCVA-related ascent overspreading France. Ahead of and underneath this cloud band, isolated thunderstorms are developing over France. This activity should increase during the next few hours and slowly spread into the COPS region. Additional storms have already developed over the Vosges and the Black Forest, but this activity should gradually move eastwards and decay after sunset. The showers and thunderstorms that move into the domain from France, may last well into the night.

For tomorrow (Monday), things now appear to be somewhat uncertain. GFS 12Z does not produce deep CAPE (i.e., deeper than 500 hPa) until late afternoon/evening, unless in the very southwestern parts of the COPS area. The mesoscale model ensembles indicate a decreasing trend of the precip during the day, but the 12Z runs are not available yet. The earlier GFS supported the solution of the mesoscale models. This trend was associated with drying of the lowest layers, which could be associated with vertical mixing. Current thinking is that scattered, comparatively shallow showers and maybe isolated thunderstorms should occur during the first half of the day, with a slight chance of additional late-afternoon development of thunderstorms.

On Tuesday, it is now simulated that a more substantial region of CAPE will develop in response to diurnal heating. However, bulk of precipitation will likely develop east of the COPS area, but it seems that isolated thunderstorms may occur also over the Vosges and the Black Forest in the afternoon and early evening hours.

Wednesday remains uncertain in terms of CAPE. The GFS 06Z run showed somewhat broader regions of positive CAPE in the warm sector than the previous runs, so the hope for convective development also over the COPS region still appears to be justified. If storms develop, the kinematic setup is still advertised to be favorable for severe evolution.

Original Discussion

Synoptic Overview

By Monday morning, the upper trough over the British Isles will merge with a cut-off low now located over Iceland, resulting in a large and intense upper low, centered over the northern British Isles. Several short waves orbiting around the main upper low will affect western Europe during the next days. One quite vigorous short-wave trough will induce strong cyclogenesis west of the British Isles on Tuesday. As this low tracks northeastwards, strong southwesterly low-level flow/warm advection will establish over western Europe. Eventually, the entire longwave trough and the cold front attendant to it will leap eastwards towards the middle of the week. After the passage of the cold front over the COPS area early on Thursday, little convective activity is expected on the days to follow.

Analysis and Forecast of Synoptic Controls in the COPS Region

Sunday 12 August (today)
The fog that is lingering over much of the COPS area should gradually disappear until 10 UTC, whereafter diabatic surface heating should allow for the build-up of a convective boundary layer. Towards early afternoon, first thunderstorms are expected, which should remain rather isolated until early evening, however. Thereafter, large-scale upward motion associated with a short-wave trough that grazes the COPS domain will affect the region, and showers/thunderstorms should become more widespread. The evolution into the night is somewhat uncertain. The loss of diurnal heating may be compensated for by large-scale ascent. Indeed, most meso- and large-scale models advertise precipitation throughout most of the night.

Current thinking is that thunderstorms may continue until late evening (maybe as late as 00 UTC), but chance also exists that they will diminish earlier.

Monday 13 August
It seems that remnants of overnight's convection and some fog may linger over the region, which should gradually mix out as the day progresses, allowing for another round of convection around midday or towards the early afternoon. Given weak but sustained large-scale ascent ahead of the Atlantic longwave trough, storms may again last well into the late evening.

Tuesday 14 August
In contrast to yesterday's forecast, weak CAPE now appears to remain in place over the COPS region, but weak mid-level ridging is currently thought to obstruct most convective activity. Still, an isolated late-afternoon storm or two over the Vosges or the Black Forest cannot be discounted. During the day the warm-advection regime will spread across the COPS area, which should result in increasing high/mid-level clouds, which may partly be of convective nature.

Wednesday 15 August
Mid- and upper level clouds should be present over the COPS area at the beginning of the day. Some of them may be precipitating. The models do not agree on the exact location of the warm-sector precipitation/cloudiness, but it will strongly influence the subsequent convective scenario. Currently, the destabilization of the warm-sector air mass is expected to be rather modest, so that positive CAPE could fail to develop altogether. Should there be less cloudiness and precipitation in the warm sector than currently assumed, sufficient CAPE for deep convection may develop. GFS and ECMWF suggest that the cold front, as well as the DCVA-forced ascent along it, will be timed rather unfavorably, as it may affect the COPS area as late as early Thursday morning. Models including the UKMO and GEM simulate a stronger shortwave trough to approach the COPS region already on Wednesday than the GFS and ECMWF, which would enhance the destabilization.

This implies that two hurdles have to be overcome to make Wednesday an interesting convective day: The warm-sector cloudiness/rain would have to be less than anticipated and the cold front/upper trough would have to arrive either on Wednesday afternoon/evening or on Thursday afternoon/evening. Should convection form, quite strong shear and linear forcing would be in place, which would be supportive of a well-organized, and possibly severe squall line.

Extended Outlook

In the wake of the cold front, which should cross the region early Thursday, no deep instability, and no significant precipitation are simulated and deep surface-based convection seems rather unlikely.

Today, Sunday 12 August

Time/location of first convective cloud development	Shallow convective clouds developing after the fog has dissolved.
Time/location of convective storm initiation	Isolated convective storms developing around midday or early afternoon, most likely over the mountains.
Mode/coverage/evolution	Mostly slow-moving single cells. A few small convective clusters possible in the evening as coverage increases a little.
Cloud base	1250-1500 m.
Storm motion	North-eastward at 5 m/s
Maximum temperature	Around 28 °C in the Rhine Valley.
Precipitation	0 – 10 mm, very locally up to 20 mm under slow-moving storms.
Severe weather threat	Low.

Monday 13 August

Time/location of first convective cloud development	After local fog has dissolved during the morning, convective clouds will almost immediately start to form.
Time/location of convective storm initiation	Rapid development of a few small convective storms.

Mode/coverage/evolution	Single cells and small poorly-organized clusters.
Convective cloud base	1000 – 1250 m.
Storm motion	From the west at about 10 m/s.
Maximum temperature	Up to 26 °C.
Precipitation	0 – 10 mm, very locally up to 20 mm under slow-moving storms.
Severe weather threat	Low.

Tuesday 14 August

Time/location of first convective cloud development	Some cumulus developing during the morning in addition to high-level cloudiness.
Time/location of convective storm initiation	Storm development unlikely. If storms develop, most likely in the south part of the COPS area, late in the afternoon.
Mode/coverage/evolution	-
Convective cloud base	From 1250 in the south to 1750 in the north.
Storm motion	-
Maximum temperature	Up to 27 °C in the Rhine Valley.
Precipitation	1 – 5 mm, locally up to 10 mm.
Severe weather threat	Low.

Wednesday 15 August

Time/location of convective storm initiation, Mode/coverage, Evolution	Widespread high- and mid-level cloudiness. Rain may occur, but is incoherently predicted by the models. A small chance exists that thunderstorms form during the afternoon, and quickly organize into a strong squall-line. Models do not agree on that.
Maximum temperature	Up to 29 °C in the Rhine Valley.
Precipitation	10-20 mm.
Severe weather threat	Moderate. Severe wind gusts are likely if a squall-line develops.

Thursday 16 August

Time/location of convective storm initiation, Mode/coverage, Evolution	Initially, widespread stratiform cloudiness and rain, that will move off to the east and is replaced by cooler air with small and medium-sized convective clouds. Possibly a few weak showers.
Maximum temperature	Up to 23 °C in the Rhine Valley.
Precipitation	5-25 mm.
Severe weather threat	Low.

Suggestions for IOP's and down days

An IOP is advised on Sunday because a nice diurnal cycle is expected and orographically-induced convective development is expected. Storms may continue during the night and will likely redevelop early on Monday. Monday is therefore interesting as well. On Tuesday, chances for surface-based convective development are relatively low so that this day does not does not appear too interesting for COPS. Problem on Wednesday appears to be that relatively low instability is forecast and most rain may be non-convective. However, some models do forecast a setup that supports convective initiation in the late afternoon and subsequent development of a strong squall-line. Decision to perform an IOP should thus be taken at a later moment.