14th Meeting on Vegetation Databases

Vegetation Databases and Inference of Ecological Processes

Landscape Ecology Group, University of Oldenburg

4th to 6th of March 2015

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Venue: Landscape Ecology Group, Institute of Biology and Environmental Sciences, University of Oldenburg, Carl von Ossietzky Str. 9-11, 26129 Oldenburg

Programme

Wednesday, 4th of March

14:00 – 15:30	Workshop: An introduction to structural equation modelling and path analysis *by Vanessa Minden and Cord Peppler-Lisbach*
15:30 – 16:00	Coffee break
16:00 – 17:00	Continuation of Workshop: An introduction to structural equation modelling and path analysis
19:00 –	Dinner at Patio, Bahnhofstraße 11, near Central Station

Thursday, 5th of March

9:00 – 9:15	Welcome and Introduction *by Vanessa Minden, Cord Peppler-Lisbach and Jörg Ewald*
Chair	*Florian Jansen*
9:15 – 10:00	**Keynote: Contemporary range shifts and late-Quaternary niche stasis of terrestrial plants** *by Jonathan Lenoir*
10:00 – 10:30	How many plant species are there in floodplains? Estimating species richness of vascular plants based on a data base of floodplain vegetation plots *by Peter Horchler*
10:30 – 11:00	A vegetation-based index of biotic integrity applied to riparian vegetation in East Africa *by Kai Behn*

11:00 – 11:30	Coffee break
Chair	*Vanessa Minden*
11:30 – 12:00	Plant functional strategies in patterned landscapes – responses to the environment and effects on ecosystem properties *by Michael Kleyer*
12:00 – 12:30	Using structural equation modelling to disentangle the drivers of understory species richness in eutrophic forest patches *by Cord Peppler-Lisbach*
12:30 – 14:00	Lunch break
14:00 – 14:45	Poster session with introduction by every author
Chair	*Cord Peppler-Lisbach*
14:45 – 15:15	Bavarian Scots pine forests rich in lichen species - Sets of old relevés help to predict future development *by Anton Fischer*
15:15 – 15:45	Environmental, spatial and structural components in the composition of mountain forest in the Bavarian Alps *by Barbara Michler*
15:45 – 16:15	Coffee Break
Chair	*Ute Jandt*
16:15 – 17:00	**Keynote: Modeling long-term forest dynamics: Interfacing succession models with empirical data leads to surprises** *by Harald Bugmann*
17:00 – 17:30	Subsidiary, but diverse: mountain forest understorey depends on disruptions of the competitive hierarchy *by Jörg Ewald*
17:30 – 18:00	Vegetation dynamics in unmanaged mountain forests following bark beetle induced spruce dieback *by Maria-Barbara Winter*
18:00	Day's summary and technical information *Vanessa Minden & Cord Peppler-Lisbach*
19:00 -	Conference Dinner at Loft, Baumgartenstraße 2, Oldenburg City Center

Friday, 6th of March

Chair	*Jörg Ewald*
9:00 – 9:45	**Keynote: Nutrient Network: synthesis through modularized experiments and data analysis** *by Helmut Hillebrand*
9:45 – 10:15	VegetWeb 2.0 - state of affairs and invitation for cooperation *by Florian Jansen*
10:15 – 10:45	Coffee break
10:45 – 11:15	sPlot – the new global vegetation-plot database for addressing trait-environment relationships across the world's biomes *by Ute Jandt*
11:15 – 11:45	Conclusion and plenary discussion
11:45	End of conference and farewell

Keynote Abstracts

Modeling long-term forest dynamics: Interfacing succession models with empirical data leads to surprises

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Forest succession models have originally been developed to provide a broad understanding of the relationship between ecological processes and time-dependent patterns of biomass, diversity, and ecosystem structure in unmanaged forests. As such, they have been quite successful. Over time, this class of models has increasingly been used to study applied phenomena such as the impacts of climate change on forests. In this context, however, statements about the few unmanaged forests that are left in Europe are of little significance, and the models thus were also used to study managed forests.

Over the last decade, we have seen an ever higher local accuracy of these models, particularly by interfacing the models with empirical data from forest reserves and growth-and-yield plots. As a result, our confidence in their 'predictions' of ecological dynamics for the coming decades at the stand scale has increased a lot.

In my presentation, I will discuss the rationale underlying these models, I will review early applications as well as more recent studies that were geared towards higher local accuracy, and I will demonstrate the paradox that we have encountered in recent studies: succession models parameterized for short-term applications cannot be used to study long-term ecological dynamics (and vice versa), and models parameterized for simulating species distributions are not suitable for simulating local dynamics (and vice versa). I will try to explore reasons for this paradox, which may lie with the empirical data, the methodology underlying the parameterization, or the model structure itself.

Contemporary range shifts and late-Quaternary niche stasis of terrestrial plants – inference from vegetation databases

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As increased temperature associated with climate change exceeds species' thermal tolerances, species need to track (distribution shifts) or adapt (niche shifts) to changing environmental conditions to avoid extinction. Starting from the geographical space, I will first present published work based on several national vegetation databases from France and documenting observed changes in the geographical distribution of forest plants during contemporary climate change (from 20th century onwards). Despite significant changes in forest plant species distribution, the magnitude of these observed range shifts do not match the magnitude of expected range shifts given climate change alone suggesting time lags in the biotic responses of forest plants to contemporary climate change. Switching to the ecological space, I will then present ongoing work based on two European vegetation databases to tackle a very old and important debate in ecology that is still unresolved, namely the debate on whether or not the realized climatic niche of terrestrial vascular plants is conserved in space and time (thousands of years). Focusing on a large set of distant populations of the same native plant species that established in both the European Alps and Fennoscandia during the late-Quaternary period, preliminary results suggest strong conservatism of the realized climatic niche. Such empirical evidence of recent range shifts lagging behind contemporary climate change and long-term (thousands of years) stasis of the realized climatic niche of terrestrial plants have important implications for species distribution models forecasting future range shifts.

Nutrient Network – synthesis through modularized experiments and data analysis

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Ecological research often produces context-dependent results, which are not easily generalized across all ecosystems of a similar type. This has lead to the development of meta-analyses as a statistical tool to quantitatively synthesize information from different studies and to detect general tendencies across multiple field sites. The success of meta-analysis is constrained by the fact that generalization is difficult if methods used to manipulate variables of interest, measure relevant response variables and analyze data strongly diverge between the different studies. Therefore, the Nutrient Network (www.nutnet.org) has been funded to perform the same manipulations and measurements at >50 field sites worldwide, covering the full range of grassland-type ecosystems on Earth. This Network science couples the advantages of a standardized, well documented approach with the possibility to draw general (global) inferences based on the multitude of observations. This allows using the network to analyze long-standing ecological questions such as i) does diversity show a predictable pattern with system productivity?, ii) are diverse systems more stable, iii) do invasive species behave differently in native and exotic ranges.

Abstracts of Oral Presentations

How many plant species are there in floodplains? Estimating species richness of vascular plants based on a data base of floodplain vegetation plots

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Keywords: vascular plants, species richness, floodplain, richness estimation, rivers

Species richness of river floodplains is sometimes compared to that of tropical rain forests. But how many species do we really find there? Answering this question is not only of scientific interest, it may also support national and EU wide strategies to fight biodiversity loss. On a German scale, floodplains are among the most threatened habitats and at the same time, being dynamic systems by nature, they offer a great potential for revitalisation. Therefore, sound information on the biodiversity of rivers and river stretches is required. As exact point data of single plant (or animal) species are lacking, the most straightforward approach to estimate species number is to rely on information of vegetation plots. The big data base AuVeg (a database of German floodplain vegetation), currently containing 5159 georeferenced vegetation relevés, provides a base to answer the questions at hand. Besides absolute counts of species for the rivers Rhine, Elbe and Danube the total pool of expected species was calculated via Chao, first and second order Jackknife, and Bootstrap. Overall, 1066 vascular plant species have been recorded along 940 river kilometres. The estimates of the total species pool range from 1137 to 1295.

The respective figures for the rivers are: Rhine: 754 (est. 810 – 925) species in 2091 relevés along 500 rivers kilometres, Danube: 702 (est. 751 – 854) species in 2158 relevés along 70 river kilometres, Elbe: 486 (est. 529 – 629) species in 696 relevés along 370 river kilometres. Although there is bias in the data due to differences in the spatial extent of vegetation sampling and collection preferences such as neophyte species, as well as forest or grassland habitats, the numbers are presented here but have to be discussed. None of the species accumulation curves reaches an equilibrium indicating that there might be more species in the floodplains considered.

A vegetation-based index of biotic integrity applied to riparian vegetation in East Africa

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Keywords: Index of biotic integrity, vegetation ecology, wetlands, disturbance, East Africa

Indices of biotic integrity become increasingly important in the assessment of anthropogenic disturbances on riparian ecosystems. In East Africa, a growing demand for food production involves the conversion of riparian zones into croplands, especially within arid regions. Drainage and intensification of land use are among those factors with adverse effects on biodiversity, productivity and provision of ecosystem services.

Despite numerous indices based on vascular plants or macro-invertebrate assemblages have been developed elsewhere, a vegetation-based index of biotic integrity for East African wetlands is not yet available. To cope with this gap, we developed an index based on vegetation properties that can be time and cost efficiently recorded in the field. This index may help to monitor the ecological state of a wetland, give a trend about potential losses of ecosystem service provision and may support the development of sustainable land use strategies.

During a multidisciplinary field campaign, data on the biophysical and socioeconomic attributes were collected in different floodplains and inland valley ecosystems in Kenya, Rwanda, Tanzania and Uganda. Data collection was referred to "assessment units", represented by patches in the landscape with a similar physiognomy (vegetation formation) and similar land use properties (type and intensity).

Different variables describing vegetation properties were tested for responses to a referential disturbance index. This index was built out of variables such as land use, drainage intensity or agrochemical inputs to crop fields. Such relations were compiled in an

assessment model that generates the index as a prediction for disturbance intensity in the respective units.
Results show that variables such as the total cover of vegetation or the proportion of annual species can properly differentiate between different disturbance intensities. These general metrics allow an application of the index in a wide range of localities and wetland types. An additional, more specific metric (e.g. cover of Cyperaceae) can be added optionally according to wetland and land use types.
Linking this assessment method to samples stored in a local database (SWEA-Dataveg, GIVD AF-00-006) provides us the possibility to compare assessments of recent records and old ones, if available, and the automatization of data assessment for monitoring strategies.

Plant functional strategies in patterned landscapes – responses to the environment and effects on ecosystem properties

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Plants need to secure growth, persistence, regeneration and dispersal in patterned landscapes. Increasing biomass allocation to one of these functions requires a proportional allocation increase or decrease to the other functions, indicated by positive or negative scaling relationships among traits associated with these functions. Combining the analysis of scaling relationships among traits with their responses to environmental conditions reveals how plant functional strategies change on environmental gradients. Changes in functional strategies often also affect ecosystem properties such as vegetation and soil carbon stocks. In this presentation, I will present some case studies demonstrating how functional strategies respond to the environment and affect ecosystem properties.

Using structural equation modelling to disentangle the drivers of understory species richness in eutrophic forest patches

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Keywords. Biodiversity; Deciduous hardwood forest, Habitat heterogeneity; Habitat continuity; Isolation; Species area relationship

Our study aimed at analyzing and disentangling the driving factors for the understory diversity of isolated eutrophic hardwood forest patches in northwestern Germany. The isolation of these patches results from extensive agricultural land use and prevailing poor soil conditions in the surrounding landscape. Thus, the patches are embedded within a matrix of both, open habitats and species-poor acidic forests. We surveyed 76 eutrophic forest patches and recorded all vascular plant species. Several measured site variables were divided into soil and structural components, and into variables describing mean site conditions and site heterogeneity. Partial least squares structural equation modeling (SEM-PLS) was employed to determine the direct and indirect effects of patch area, site heterogeneity, mean site conditions, isolation and habitat continuity on species richness and relative proportions of several species groups.

The most important factor determining species richness was patch area, which showed the strongest direct effect on eutrophic forest specialist species. Diversity of forest matrix species was not directly influenced by area. Soil and structural heterogeneity increased with area, but only soil heterogeneity was relevant for species richness. Soil heterogeneity was more important for forest species in general and stress tolerators than for generalist species, non-forest species, competitors and ruderals. Mean site conditions influenced species richness of generalists, open habitat species, competitors and nutrient demanding species. Isolation had a (negative) effect only on habitat specialists. The relative proportions of species groups were generally not affected by site heterogeneity and only slightly affected by area. Shifts in relative proportions were mainly driven by mean site conditions. In conclusion, large and well-connected habitat patches are especially important for the successful conservation of the unique and partly endangered flora of eutrophic hardwood forests.

Bavarian Scots pine forests rich in lichen species - Sets of old relevés help to predict future development

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Keywords: pine forests, historic and recent releves, Bavaria

"Scots pine forests rich in lichen species" ("Flechten-Kiefernwälder") were wide-spread in Bavaria on sandy acidic as well as on sallow soils on quartz bedrock during the past centuries, but nowadays they are said to be endangered. We asked the questions: (1) Did the species composition of this forest type really change during the past decades and if yes, how? (2) Did the area covered by this pine forest type really decrease in the past two decades? (3) What are the reasons for a change and what can be done to protect this forest type in the future?

Out of a set of 2363 relevés from pine dominated Bavarian forests we selected with the help of multivariate statistics 216 relevés which represent the Scots pine forests rich in lichen species as they had been described between mid and end of 20th century. This set now may be used as a benchmark of the floristic quality of recent stands of this forest type. 30 lichen species (most of them genus Cladonia) were present at that time; in 50% of the relevés lichen cover was larger than 18%, in 25% of the relevés higher than 38% with a maximum of 81%. This is reflected in the scientific name "Cladonio-Pinetum".

We were able to exactly identify the localities of 30 relevés from the 1980s and to re-collect relevés on (nearly) the same places in 2014. Cover degree of lichens in these stands in the past 2-3 decades decreased from 40 to only 6%, while cover degree of mosses increased from 25 to nearly 70%. All these stands can no longer be called "Cladonio-Pinetum". This degradation process is going on in managed as well as in totally unmanaged forest stands ("Naturwald-reservat"). Not only the "floristic quality" is getting lost but also the total area covered by this forest type: in a certain area close to the city of Nürnberg the area covered with this forest type decreased by around 90%.

Only based on a huge number of historic relevés it is possible to make this strong degradation process visible. The most probable future prospects for this forest type

Environmental, Spatial and Structural Components in the Composition of Mountain Forest in the Bavarian Alps

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Keywords: Bavarian Alps, Constrained ordination, Environmental gradients, Forest management, Species composition, Variance partitioning

Forests in alpine regions provide ecosystem services far beyond pure timber production, e.g. protection against snow avalanches and rock fall. Knowledge of ecological gradients is crucial in understanding patterns of biodiversity, productivity and risk in mountain forests. In the light of global climate change it becomes essential for management planning to know whether these protective forests depend on soil rather than on climate. A combined systematic and stratified sampling design was conducted in mountain forests of the Bavarian Alps to find the principal dimensions of compositional variation of vegetation and their environmental drivers. In 1,505 plots species composition, forest types and soil profiles were recorded. Data from 14 climate stations were included. As we hypothesized that the tree layer is more influenced by management than the understorey and that the former modifies the habitat of the latter, the two matrices were analysed separately and the species composition of the tree layer was used as a structural predictor variable for the understorey. We applied constrained ordination to reveal the main gradients in floristic composition and variance partitioning to examine the portions of climatic, edaphic, spatial and structural components. Ellenberg indicator values and a generalized linear model were used to test whether a significant spatial gradient exists from east to west, the main spatial extent of the investigation area. Forest types were used as an overlay to assess the underlying environmental factors.

It turned out that explained variance of the tree layer was considerably lower than in the understorey. Tree layer composition was more influenced by climatic variables than by soil. In the understorey, edaphic and climatic variables contributed almost equally to explained variance, but the tree layer had an additional explanatory power. No continentality gradient could be detected within the investigation area. Plant communities were well separated along gradients of acidity, moisture, nutrients and climate, which broadly confirms the known gradients for montane and subalpine zonal forests in the region. The study provides a quantitative synthesis of the knowledge on a diverse set of community types, which has so far been subject to disparate and sectorial treatment in the Bavarian Alps.

Subsidiary, but diverse: mountain forest understorey depends on disruptions of the competitive hierarchy

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Keywords: forest ecology, path analysis, plant species richness, vegetation plots

It is common sense that plant species density of forests depends on species pool size, productivity and disturbance regime. It is also well known that understorey contributes the lion's share of plant richness in temperate and boreal forests. The latter pattern is mediated through a cascading effect of stand disturbance on understorey productivity and population density and can be interpreted as an outcome of a competitive hierarchy. Empirical evidence from vegetation plot databases of mountain forests in the Bavarian Alps and in Bavarian Forest National Park supports the hypothesis. Thus, results of path analysis suggest a top-down control of understory biomass by the tree canopy, which limits species density through a mass effect. The comparison of calciphytic (Alps) and acidophytic (Bavarian Forest) communities confirms competitive hierarchy as a general pattern, that is played out at different levels of species richness constrained by species pool size. As a consequence, forest plant biodiversity depends on occasional disruptions of the canopy by natural or anthropogenic disturbances, where shade-tolerant climax tree species will otherwise monopolise resources to a degree that marginalises most other plants.

Vegetation dynamics in unmanaged mountain forests following bark beetle induced spruce dieback

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Keywords: Natural disturbances, Ips typographus, Forest succession, Vegetation dynamics, Berchtesgaden National Park

Early-successional forest ecosystems developing after natural disturbances, such as insect outbreaks, can support high diversity of habitat structures, species and processes. However, the specific structural and taxon responses that best define a distinct early-seral phase, and the longevity of that phase, remain important research questions. To address these questions, we assessed stand structural heterogeneity, species density of vascular plants and regeneration dynamics in the initial early-seral period (~3 years after severe bark beetle outbreak), advanced early-seral period (~17-25 years after severe bark beetle outbreak) and mature spruce forests in unmanaged montane and high-montane ecosystems in Southeastern Germany. We evaluated the hypothesis that changes in structural heterogeneity and increases in diversity would peak in the initial stage and attenuate toward mature forest conditions by 17-25 years as the tree canopy closed.

We found a clear change in forest structural heterogeneity following the outbreak – most prominently in reduced cover and more clustered patterning of live trees, increased light availability, increased cover of shrubs and herbs, and high volume of dead wood. The majority of the advanced early-seral sites, twenty years after the dieback of the mature Norway spruce stands, were already quite densely stocked. The regeneration was clustered and was dominated by sycamore maple and Norway spruce. Nevertheless, the diversity of the herb and shrub layer showed maximum diversity also in the advanced early-seral stage indicating that the timeframe over which diversity increases occurred tended to be on the order of decades rather than years.

Our findings suggest that in unmanaged forests after bark beetle attack, a structurally complex phase prior to tree canopy closure can last several decades, and that many aspects of early-seral biodiversity and ecosystem function only fully develop given this extended time period.

VegetWeb 2.0 - state of affairs and invitation for cooperation

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Keywords: vegetation plot, Germany

One year after starting the development of the new national vegetation database platform for Germany we are now ready to offer a clear concept of how things will work. Data owners are cordially invited to submit vegetation plot data in any digital format to the platform. They can choose between three license regimes for their data: 1) free access, 2) according to a specific agreement, and 3) blocked.
The enquiring partners who want to use data have to write a short proposal stating their interest. Their request containing the actual collection of plots as well as their formal search query will be stored on the server for referencing. Whereas free access data will be available immediately (and blocked data never), the intermediate license type ("protected data") invokes a process of negotiation between the partners. The request might offer Co-authorship in a publication, a proper citation or data in exchange and the data custodian can decide, if he is satisfied by this offer or not. The resulting basket of available plots will get an Uniform Resource Identifier with http scheme (i.e. a fixed web address) which enables us to offer the approved data to the permitted user, and to give a permanent reference which can be cited in publications. We will be able to count the number of usages of plots, which produces a data citation index similar to well known metrics like the science citation index. The talk will also give information about technical details like data formats. The export is planned to be possible in flat table CSV format, in Turboveg format and with an application programming interface (API) which will allow instantaneous access from any software like the R statistical environment.

sPlot – the new global vegetation-plot database for addressing trait-environment relationships across the world's biomes

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Background: The trait composition of plant communities is determined by abiotic, biotic and historical factors. However, the relative strength of macro-climatic factors in explaining trait-environment relationships at the local scale remains unclear. With the aim to achieve a better understanding, in March 2013 the first sDiv workshop ("sPlot") assembled a unique group of vegetation-plot data holders and data analysts. Our main objective is to assess the relative importance of macroclimate in explaining trait variation in local plant communities worldwide. Specifically, the following questions shall be answered: (i) To which extent are relationships between traits preserved across environmental gradients worldwide, irrespective of macro climate? (ii) To which degree is the effect of local (abiotic and biotic) drivers mediated by climate? Such knowledge is crucial for ecological theory but also highly relevant to devise local management measures to mitigate the negative effects of climate change, i.e. temperature increase or precipitation decrease.

Database: During the last decade many vegetation-plot databases have emerged all over the world, although still the bulk of data in databases comes from Europe, as can be seen in the meta-database GIVD (Dengler et al. 2012). While GIVD provides knowledge about more than 200 vegetation-plot databases on all continents, it does not contain the actual data in a single uniform database. The first huge supranational database joining data from different sources was the European Vegetation Archive (EVA; http://euroveg.org/eva-database) that has been launched in spring 2014. With the sPlot database, we go a step further and build the first vegetation-plot database aiming at being globally representative. Using the same database system (Turboveg 3), sPlot contains the majority of the EVA content but combines this with selected major databases from other continents. Presently sPlot contains more than 900,000 plots from all continents and is still growing. For the planned trait analyses, it has been linked to the TRY database (www.try-db.org, Kattge et al. 2011) to get average trait values for a selected set of ecologically relevant traits. According to the sPlot "Governance and Data Property Rules", only members of the sPlot Consortium have access to the contained data for analyses and publications, providing a strong incentive to join sPlot with own data.

Status and prospects: In this talk we will give an overview on the structure and present content of sPlot in terms of spatial distribution, data properties as well as trait coverage in TRY. We will present first cross-biome analyses of community-weighed mean traits, trait variability and trait diversity. Finally, we will highlight the wealth of ecological questions, also beyond trait-environment relationships, that can be addressed with sPlot in a novel way and invite collaborations in doing so.

References

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Abstracts of Poster Presentations

Dry-grasslands (Festuco-Brometea) of Saxony

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Keywords: Festuco-Brometea, saxony

Here we present a preliminary synthesis of the dry-grasslands, which belong to the class Festuco-Brometea. The work is based on more than 200 relevés from own observations and several publications. The relevés could assigned to the alliances Festucion valesiacae, Cirsio pannonici-Brachypodion, Bromion erecti, Koelerio-Phleion phleoidis. A high percentage of relevés cannot clearly assigned to a certain association because of degradation and transitions to the mesophytic grasslands (Arrhenatheretalia).

The change in species composition and structure of some dry-grassland-types we observed in one major nature reserve by repeating relevés after 9 years. We unexpected recognized an increase of the species-number and of indicator species, but the grass-cover decreased. The opposite effects we observed at the edge of the meadows, where the cover of nitrophytic and ruderal species increased.

Half a century of vegetation changes in a suburban forest

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Keywords: forest management, resurvey study, vegetation changes

The Natural park Klánovický forest lies on the north-eastern fringe of, so it is immediately exposed to human influences. It extends across former agricultural land surrounding extinct medieval villages. Its flora consists of acidophilous and hygrophilous plant species growing on nutrient-poor sandy soils in mostly acidophilous oak forests. Detailed research of forest vegetation in the area was conducted over fifty years ago when former coppice management was still evident. In 2014, based on accurate maps, I carried out a vegetation resurvey of 25 semi-permanent plots and took 18 soil samples from five soil pits. The main changes in vegetation are a decrease in heliophilous species and invasions of nonindigenous species. The soils in the forest have suffered a drastic loss of basic ions, so a slightly decreased pH and also a change the water regime can be expected. The following factors significantly influenced the current composition of the vegetation: (i) medieval site history, (ii) spread of cultivated plants from abandoned buildings and plantations, (iii) browsing and disturbances by game and humans, and (iv) forest management.
Differences in species composition revealed by the resurvey probably indicate real changes in vegetation, as evidenced by similar studies. It is certain that the forest communities in the area are being invaded by many non-native plant species and are undergoing massive expansion of hornbeam as a consequence of changes in forest management (i.e. the transition from coppicing to standard forestry practices).

This work was supported by a project COPPICE (CZ.1.07/2.3.00/20.0267).

Inventory of ornamental plants in the Czech Republic: How private gardens support the spread of alien plants?

[1]**Petr Petřík**, [1]*Jiří Sádlo*, [1]*Irena Perglová*, [1]*Martin Hejda*, [1,2]*Kateřina Štajerová*, [1,2]*Petr Pyšek*, [1]*Jindřich Chrtek*, [1]*Lenka Moravcová*, [1,3]*Jiří Danihelka* & [1]*Jan Pergl*

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Keywords: human impact, urban biodiversity, plant invasion

Human settlements harbour more plant species than surrounding landscapes and consequently they are major sources for spread of alien species. Whilst the flora of public area has been widely studied, the flora of private areas is poorly known and the role of private gardens as primary sources of propagules of alien species has not been assessed. Within the project we collated data on propagule pressure (frequency of planting in private gardens) to understand its role for naturalization. Additional data for the species such as residence time in the Czech Republic or reproduction traits were also gathered. To cover the range of variables we were inventorying a wide range of urban and countryside settlements types. The types include several “urban type categories” (large cities, villages, old urban city parts and new urban sprawl as a significant phenomenon of last decades). In the presented project we sampled 174 villages/parts of cities and towns. During the inventory we found more than 1500 taxa which were cultivated in private gardens. Within the most frequently planted species were shrubs like Buxus sempervirens or Syringa vulgaris but also herbaceous plants Sedum spurium or Phlox paniculata. Surprisingly, among the most recorded species are only a few species known to be invasive in the Czech Republic (Solidago Canadensis or Lupinus polyphylus). When assessing the potential impact of planted species through hybridization, we found, that only 2% of cultivated taxa are known to hybridize with native flora (e.g. Viola ×wittrockiana) and only 11% of species are known to potentially hybridize with native species.

Using variance partitioning and PCNM, it was proved that socioeconomic variables such as, e.g., housing density and occupancy, human density and age of population, employment rate may override the distribution along altitudinal gradient. The altitudinal gradient is evidently less important due to horticulture management (irrigation, fertilization) and spatially correlated behaviour of gardeners (sharing of species with neighbours or shopping in the same garden centres). It seems that ornamental horticultural does not represent important source of invasion in recent landscape, however, the weed risk should be assessed.

The study was supported by P504/11/1028 and Praemium Academiae.

Weihenstephan Vegetation Database (WeiVegBase)

[1]Hagen S. Fischer, [2]Barbara Michler, [2]Michael Schwall, [2]Thomas Kudernatsch, [2]Helge Walentowski & [3]Jörg Ewald

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Keywords: Vegetation database, spatial and temporal subsampling, PostgreSQL

Since more than 100 years data on species composition of vegetation plots are recorded according to the quasi standard of Braun-Blanquet (1913, 1964). Nowadays such data are commonly stored in electronic data bases. Most vegetation data bases that are in use today are based on a tree-table data model which contains a list of the projects, a list of site factors and a list of species growing on the plot with their importance values. This is sufficient for many classical phytosociological projects.

But there are a lot of projects that feature a structure that cannot be represented by a tree-table data model. Relevés from strict forest reserves in Bavaria ("Naturwaldreservate") are clustered in topographical space. Information associated with the nature reserve exists as well (e.g. date of designation) as information associated with individual relevé. Moreover in some projects spatial subsampling was applied (e.g. recording detailed information in smaller subplots). In these cases some data are related with the whole relevé whereas others refer to subplots. Permanent plot research and resurvey projects produce data that may change with time (like cover, temperature or management) as well as data that may not change (e.g. altitude a.s.l.).

The aim of WeiVegBase is to provide a data model that stores these data in a normalized relational database without losing original information. The data base in implemented in the open source software PostgreSQL (www.postgresql.org), but the structure can be used in any other relational database system. An overview of the structure of the database will be presented.

“Original data are worth a thousand analyses" - some reflections on the age of metadata analysis

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Keywords: vegetation science, data analyses, field data collection, journal policies

The advances in knowledge combined to the increasing capacity of data storage and analysis involve a continuous formulation of new topics and issues. In recent years, many efforts have been done towards comprehensive syntheses to streamline and make use of the bulk of phytosociological data produced in the last century.

The analysis of such a large number of data is a complex task; moreover, much of the data are not (or no longer) available to the direct observation of analysts. The approach to metadata analysis is, therefore, indirect. This is both an asset and a limitation of the human faculty of knowing. In phytosociology, a crucial point is the relationship between the observer and the observed phenomenon. On the one hand, the observer can exert a considerable influence on the phenomenon which brings to attention; on the other hand, any research on vegetation, whether statistical-comparative or dynamic, will never give you more than a minimum amount of information that is generally applicable or remains verifiable, don't say on the millennial scale, but even on the secular scale. Does this make vain the effort made in metadata analysis? Not at all: it simply breaks definitively the equation between objectivity, accuracy and truth that has long been an emblem of the very idea of science and, at the same time, a strong argument for the detractors of phytosociology. In order to fully benefit from the synthesis efforts that characterize this age of the research in vegetation science, we should avoid creating a gap between the élite of data analysts who publish their synthesis on highly visible scientific journals and propose their comprehensive views, and those who (still) produce original data, with little hope of seeing them published on international journals and even less hope of an adequate recognition of their work and their own interpretation of reality.

Instead, the ongoing revolutionary process that the information technology and the "publish or perish" rule operate in vegetation science seem to demand a price: that of an unconditional subjection to data analysts and their view, along with the weakening and rarefaction of field data collectors.

German Coastal Vegetation Database

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Keywords: dunes, saltmarshes, heathlands, woodlands

Presentation of a vegetation database dealing with all vegetation types in coastal areas of Germany, from drift line and salt marsh to woodland vegetation. Recently, more than 10,000 plot-based relevés with a time-span from 1940 to 2014 are available. It is an ongoing project, partly funded by the Niedersächsische Wattenmeer Stiftung.

Weihenstephan Vegetation Database (WeiVegBase)

*[1]Hagen S. Fischer, [2]**Barbara Michler**, [2]Michael Schwall, [2]Thomas Kudernatsch, [2]Helge Walentowski[2] & [3]Jörg Ewald*

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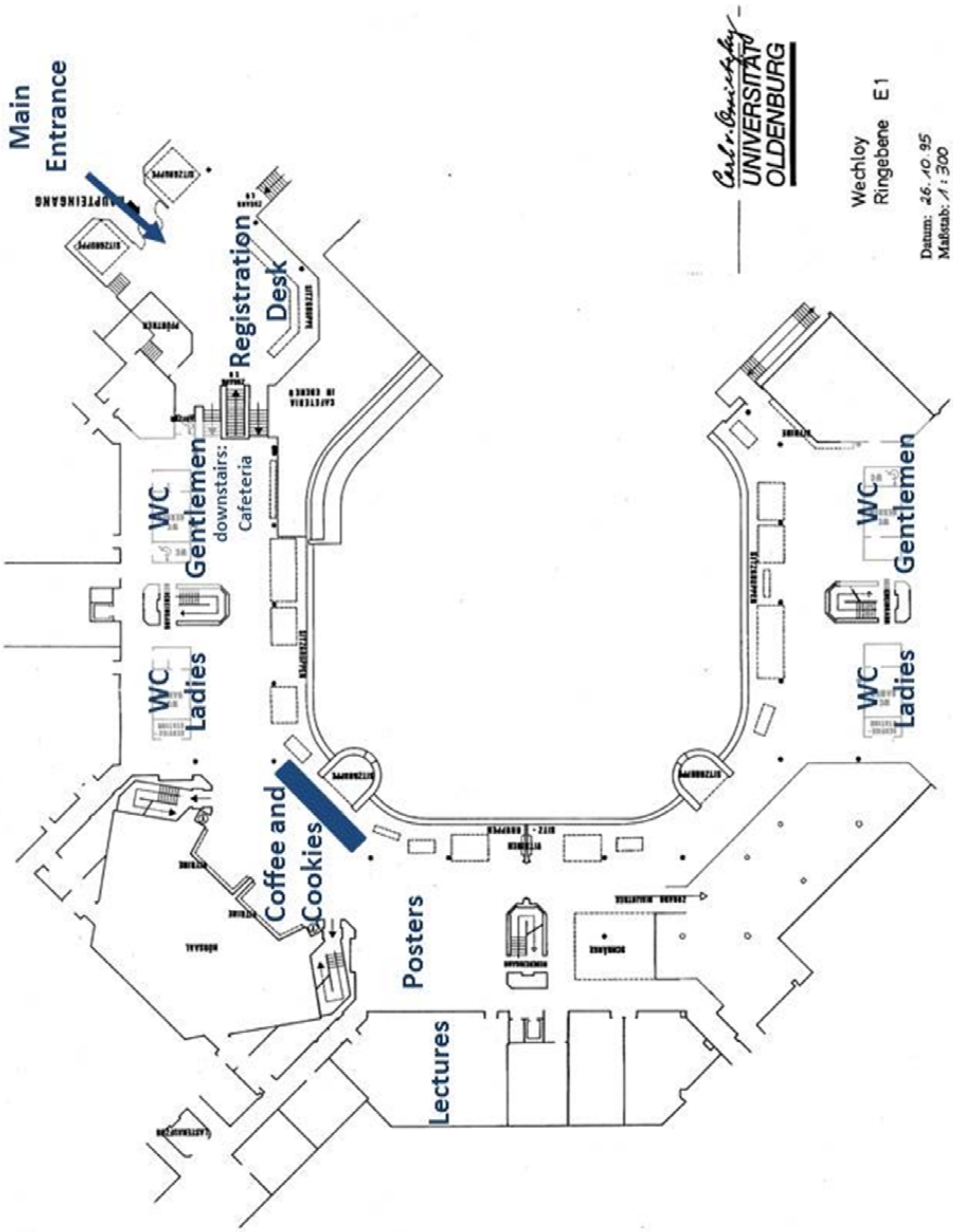
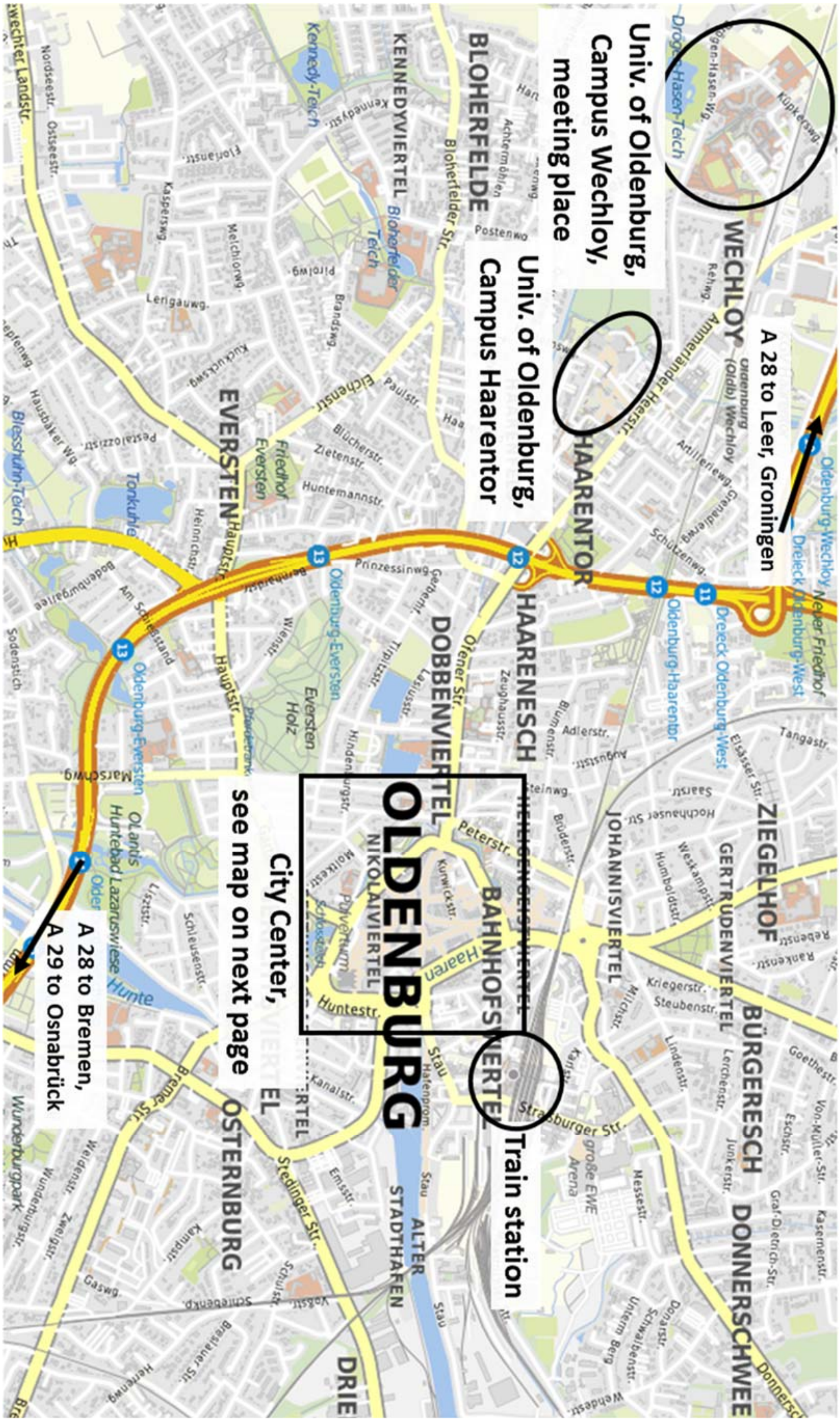
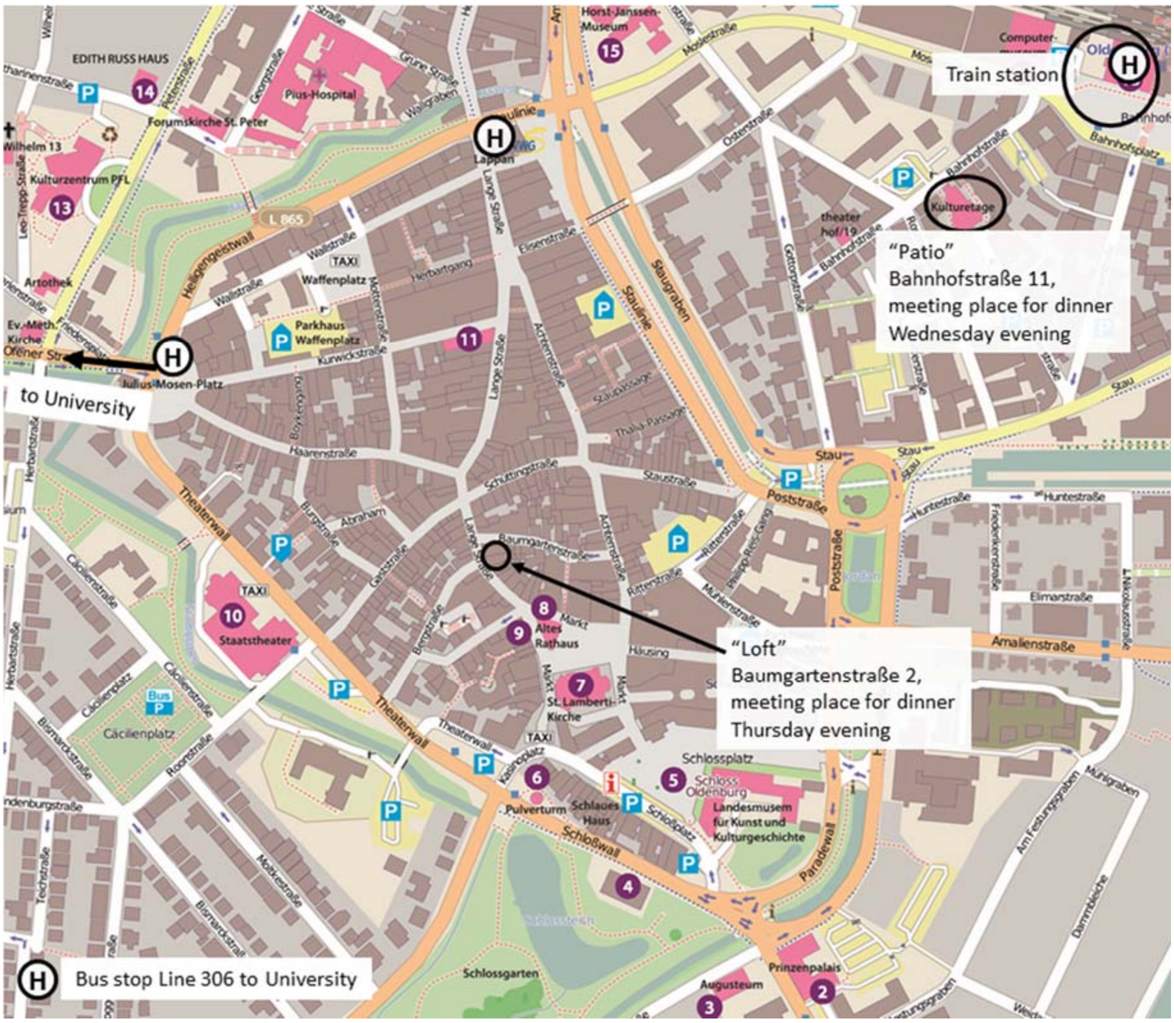
Map of Venue


Main Entrance
Registration Desk
WC Gentlemen
downstairs: Cafeteria
WC Ladies
WC Gentlemen
WC Ladies
Coffee and Cookies
Posters
Lectures
UNIVERSITÄT OLDENBURG
Wechloy
Ringebene E1
Datum: 26.10.95
Maßstab: 1:300

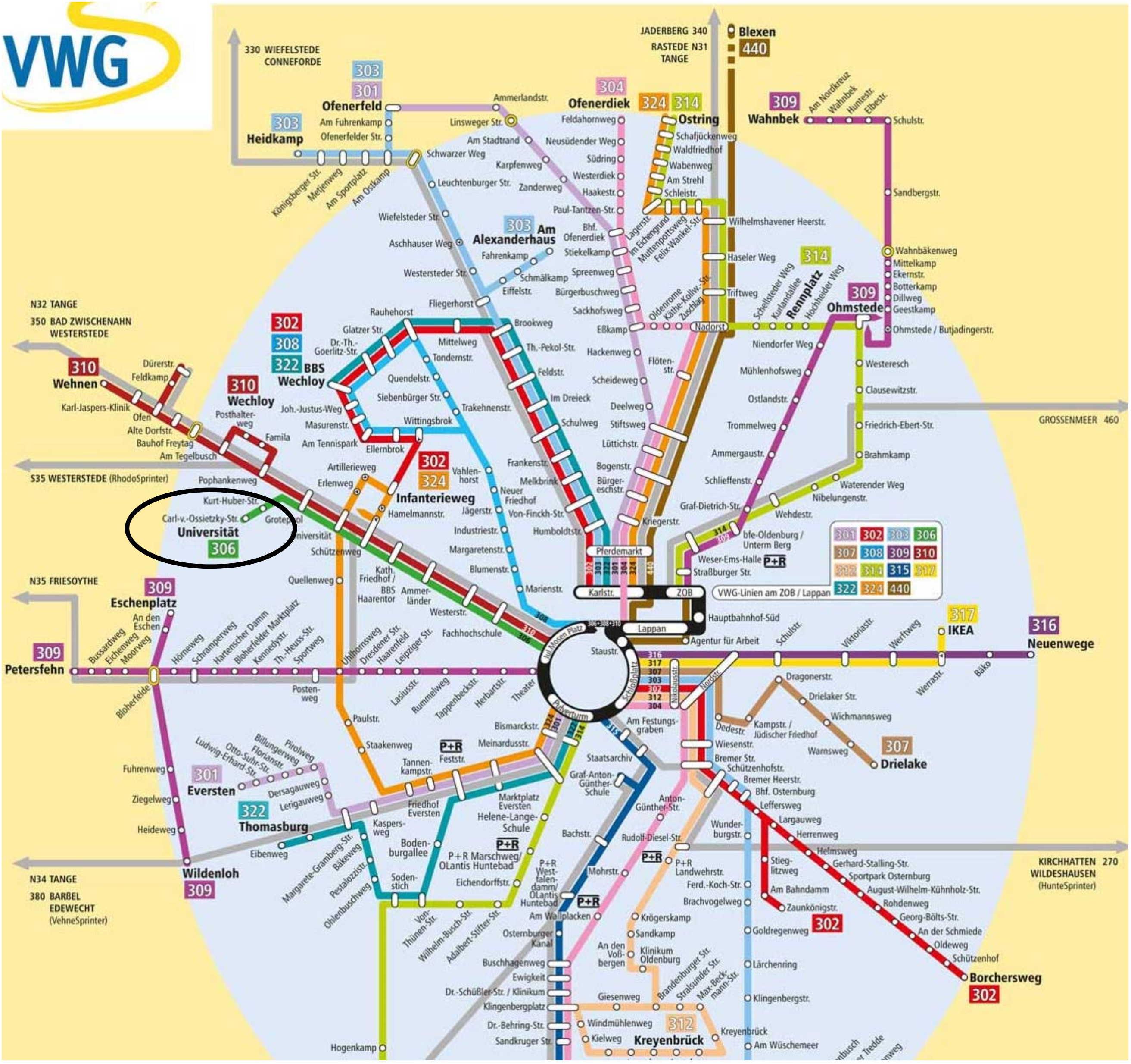
Map of Oldenburg



Map of City Center



Route map


VWG
330 WIEFELSTEDE CONNEFORDE
303
301
Ofenerfeld
Heidkamp
Am Fuhrenkamp
Ofenerfelder Str.
Ammerlandstr.
Linsweger Str.
Am Stadtrand
Schwarzer Weg
Leuchtenburger Str.
Karpfenweg
Zanderweg
Wiefelsteder Str.
Aschhauser Weg
Am Alexanderhaus
Fahrenkamp
Schmälkamp
Eiffelstr.
Westersteder Str.
Fliegerhorst
Rauhehorst
JADERBERG 340
RASTEDE N31
TANGE
Blexen
440
304
Ofenerdiek
324
314
Ostring
Feldahornweg
Neusüdender Weg
Südring
Westerdiek
Haakestr.
Paul-Tantzen-Str.
Bhf. Ofenerdiek
Stiekelkamp
Spreeweg
Bürgerbuschweg
Sackhofsweg
Eßkamp
Schafjückenweg
Waldfriedhof
Wabenweg
Am Strehl
Schleistr.
Wilhelmshavener Heerstr.
Haseler Weg
Triftweg
Nadorst
309
Wahnbek
Schulstr.
Sandbergstr.
Wahnbäkenweg
Mittelkamp
Ekernstr.
Botterkamp
Dillweg
Geestkamp
Ohmstede / Butjadingerstr.
Rennplatz
Ohmstede
Niendorfer Weg
Mühlenhofsweg
Ostlandstr.
Trommelweg
Ammergaustr.
Schlieffenstr.
Westeresch
Clausewitzstr.
Friedrich-Ebert-Str.
Brahmkamp
Waterender Weg
Nibelungenstr.
Wehdestr.
GROSSENMEER 460
N32 TANGE
350 BAD ZWISCHENAHN WESTERSTEDE
310
Wehnen
Dürerstr.
Feldkamp
Karl-Jaspers-Klinik
Ofen
Alte Dorfstr.
Bauhof Freytag
Am Tegelbusch
Wechloy
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Famila
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Carl-v.-Ossietzky-Str.
Grotepol
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306
302
308
322
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Quendelstr.
Siebenbürger Str.
Joh.-Justus-Weg
Masurenstr.
Am Tennispark
Wittingsbrok
Ellernbrok
Trakehnenstr.
Artillerieweg
Erlenweg
324
Infanterieweg
Hamelmannstr.
Vahlenhorst
Neuer Friedhof
Jägerstr.
Industriestr.
Margaretenstr.
Blumenstr.
Marienstr.
Brookweg
Th.-Pekol-Str.
Feldstr.
Im Dreieck
Schulweg
Melkbrink
Frankenstr.
Von-Finckh-Str.
Humboldtstr.
Hackenweg
Scheideweg
Deelweg
Stiftsweg
Lüttichstr.
Bogenstr.
Bürgereschstr.
Kriegerstr.
Flötenstr.
Pferdemarkt
Karlstr.
ZOB
Lappan
Hauptbahnhof-Süd
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P+R
Straßburger Str.
VWG-Linien am ZOB / Lappan
301 302 303 306
307 308 309 310
312 314 315 317
322 324 440
N35 FRIESOYTHE
309
Eschenplatz
Quellenweg
Schützenweg
Kath. Friedhof / BBS Haarentor
Ammerländer
Westerstr.
Fachhochschule
Petersfehn
Bloherfelde
Hörneweg
Schramperweg
Hartenscher Damm
Bloherfelder Marktplatz
Kennedystr.
Th.-Heuss-Str.
Sportweg
Postenweg
Uhlhornsweg
Dresdener Str.
Haarenfeld
Leipziger Str.
Lasiusstr.
Rummelweg
Tappenbeckstr.
Herbartstr.
Theater
Julius-Mosen-Platz
Staustr.
Schloßplatz
Cäcilienplatz
Schulstr.
Viktoriastr.
Werftweg
317
IKEA
316
Neuenwege
Werrastr.
Bäko
Dragonerstr.
Drielaker Str.
Wichmannsweg
Kampstr. / Jüdischer Friedhof
Warnsweg
307
Drielake
Dedestr.
Wiesenstr.
Bremer Str.
Schützenhofstr.
Bremer Heerstr.
Bhf. Osternburg
Leffersweg
Largauweg
Herrenweg
Helmsweg
Gerhard-Stalling-Str.
Sportpark Osternburg
August-Wilhelm-Kühnholz-Str.
Rohdenweg
Georg-Bölts-Str.
An der Schmiede
Oldeweg
Schützenhof
Borchersweg
302
KIRCHHATTEN 270
WILDESHAUSEN
(HunteSprinter)
Paulstr.
Staakenweg
Tannenkampstr.
Feststr.
Bismarckstr.
Meinardusstr.
Am Festungsgraben
Staatsarchiv
Graf-Anton-Günther-Schule
Anton-Günther-Str.
Wunderburgstr.
Stieglitzweg
Am Bahndamm
Zaunkönigstr.
Fuhrenweg
Ziegelweg
Heideweg
301
Eversten
Ludwig-Erhard-Str.
Otto-Suhr-Str.
Florianstr.
Billungerweg
Pirolweg
Dersagauweg
Lerigauweg
322
Thomasburg
Eibenweg
Kaspersweg
Friedhof Eversten
Marktplatz Eversten
Helene-Lange-Schule
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P+R Marschweg/ OLantis Huntebad
Eichendorffstr.
Bachstr.
Rudolf-Diesel-Str.
Mohrstr.
P+R Westfalendamm/ OLantis Huntebad
Am Wallplacken
P+R Landwehrstr.
Ferd.-Koch-Str.
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Sandkamp
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Wildenloh
309
Margarete-Gramberg-Str.
Bäkeweg
Pestalozzistr.
Ohlenbuschweg
Sodenstich
Von-Thünen-Str.
Wilhelm-Busch-Str.
Adalbert-Stifter-Str.
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Buschhagenweg
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312
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Brandenburger Str.
Stralsunder Str.
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306

Universität - Lappan - ZOB

Verkehrsverbund Bremen/Niedersachsen, Tel. 0421-59 60 59
Verkehr und Wasser GmbH (VWG), www.vwg.de

Montag-Freitag

	u												
Carl-v.-Ossietzky-Str.	16.58	16.59	17.14	17.29	17.44	17.59		18.44	18.59	19.29	19.59		23.29
Kurt-Huber-Straße	16.58	16.59	17.14	17.29	17.44	17.59		18.44	18.59	19.29	19.59		23.29
Grotepool	17.00	17.01	17.16	17.31	17.46	18.01		18.46	19.00	19.30	20.00		23.30
Universität-A	17.01	17.02	17.17	17.32	17.47	18.02		18.47	19.01	19.31	20.01		23.31
Schützenweg	17.02	17.03	17.18	17.33	17.48	18.03		18.48	19.02	19.32	20.02		23.32
Kath.Friedh./BBS Haarent.	17.03	17.04	17.19	17.34	17.49	18.04	alle	18.49	19.03	19.33	20.03	alle	23.33
Ammerländer	17.04	17.05	17.20	17.35	17.50	18.05	15	18.50	19.04	19.34	20.04	30	23.34
Westerstraße	17.05	17.06	17.21	17.36	17.51	18.06	Min	18.51	19.05	19.35	20.05	Min	23.35
Fachhochschule	17.06	17.07	17.22	17.37	17.52	18.07		18.52	19.06	19.36	20.06		23.36
Julius-Mosen-Platz-B	17.08	17.09	17.24	17.39	17.54	18.09		18.54	19.07	19.37	20.07		23.37
Lappan-A	17.10	17.11	17.26	17.41	17.56	18.11		18.56	19.09	19.39	20.09		23.39
Hauptbahnhof-Süd-B	17.11	17.12	17.27	17.42	17.57	18.12		18.57	19.10	19.40	20.10		23.40
ZOB-C	17.13	17.14	17.29	17.44	17.59	18.14		18.59	19.12	19.42	20.12		23.42

u = nur an Vorlesungstagen der Universität Oldenburg

Line 306, direction University → City Center → Train station

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Universität - Lappan - ZOB

Verkehrsverbund Bremen/Niedersachsen, Tel. 0421-59 60 59
Verkehr und Wasser GmbH (VWG), www.vwg.de

Montag-Freitag

									u		u		u		u	
Carl-v.-Ossietzky-Str.	5.59	6.29	6.44	6.59	7.14	7.29		15.44	15.58	15.59	16.13	16.14	16.28	16.29	16.43	16.44
Kurt-Huber-Straße	5.59	6.29	6.44	6.59	7.14	7.29		15.44	15.58	15.59	16.13	16.14	16.28	16.29	16.43	16.44
Grotepool	6.00	6.31	6.46	7.01	7.16	7.31		15.46	16.00	16.01	16.15	16.16	16.30	16.31	16.45	16.46
Universität-A	6.01	6.32	6.47	7.02	7.17	7.32		15.47	16.01	16.02	16.16	16.17	16.31	16.32	16.46	16.47
Schützenweg	6.02	6.33	6.48	7.03	7.18	7.33		15.48	16.02	16.03	16.17	16.18	16.32	16.33	16.47	16.48
Kath.Friedh./BBS Haarent.	6.03	6.34	6.49	7.04	7.19	7.34	alle	15.49	16.03	16.04	16.18	16.19	16.33	16.34	16.48	16.49
Ammerländer	6.04	6.35	6.50	7.05	7.20	7.35	15	15.50	16.04	16.05	16.19	16.20	16.34	16.35	16.49	16.50
Westerstraße	6.05	6.36	6.51	7.06	7.21	7.36	Min	15.51	16.05	16.06	16.20	16.21	16.35	16.36	16.50	16.51
Fachhochschule	6.06	6.37	6.52	7.07	7.22	7.37		15.52	16.06	16.07	16.21	16.22	16.36	16.37	16.51	16.52
Julius-Mosen-Platz-B	6.07	6.39	6.54	7.09	7.24	7.39		15.54	16.08	16.09	16.23	16.24	16.38	16.39	16.53	16.54
Lappan-A	6.09	6.41	6.56	7.11	7.26	7.41		15.56	16.10	16.11	16.25	16.26	16.40	16.41	16.55	16.56
Hauptbahnhof-Süd-B	6.10	6.42	6.57	7.12	7.27	7.42		15.57	16.11	16.12	16.26	16.27	16.41	16.42	16.56	16.57
ZOB-C	6.12	6.44	6.59	7.14	7.29	7.44		15.59	16.13	16.14	16.28	16.29	16.43	16.44	16.58	16.59

u = nur an Vorlesungstagen der Universität Oldenburg