

## History of Tour de France from the geographical point of view *Vladimír Bačík, Michal Klobučník*

### Abstract

*The Tour de France, a three weeks bicycle race has a unique position in the sports world. In 2013, even the 100th year of this prestige event will be held. Over almost 110-year history, people could notice unique stories and duels in particular periods, which the sports world will never forget, and celebrities that became legends, and many others. Also many places where the races took place entered the history of Tour de France. Our attempt in this article was to point out the spatial context of this event using advanced technologies for the purpose of distribution of historical facts on the Internet. The introductory part characterizes briefly the attendance of particular stage centres from a regional point of view. This part was a sort of entry into the main topic dealing with selected historical aspects of difficult ascents which decide every year on the winner of Tour de France, and also attract fans from all over the world to races taking place on French roads. At the final stage of research, the distribution of results on the website available to a wide circle of fans of this sports event played a very significant part ([www.tdfrance.eu](http://www.tdfrance.eu)). Using advanced methods and procedures we have tried to capture the historical and spatial dimensions of Tour de France in a general form and thus offer not only to the expert community a new view of this unique sports event.*

### Introduction

Worldwide in different corners of our planet, as well as in different sports branches global events are organised. The benefit of such organised events in the regions concerned is diverse. Starting from simple getting to know the region and its promotion up to the economic aspects related to the development of tourism and purchase of various goods and services at the venue of event. Thanks to advanced transmission technology and worldwide broadcasting these events get also to audience on the opposite sides of our planet, and thus allow sharing of emotions and perceiving the character of the region among viewers being thousands kilometres away of the running duels. One of the most typical sports events presenting the above characteristics is the cycling stage race Tour de France, which will celebrate its 100th anniversary in the next year. Since its origination up till now the event has been changing its regional or nationwide importance to a worldwide phenomenon, which every year attracts viewers to TV screens and millions of fans and enthusiasts from all over the world directly to the track. Years of existence have brought many unbelievable sports results, personalities who became the legends of this sport, and, naturally, also many interesting statistics, among which we can observe indirectly not only the trend in the area of direct physical performance of the actors, but also the technological progress that has accompanied Tour de France since its inception. Recording and distribution of various statistics is an important part of each sport. There are many specialized web portals devoted right to historical analyses of and distribution of results on the level of particular stages and of participating competitors. As regards the professional classification of the authors of the paper (geography), however, what is significantly neglected on such websites, or even ignored, is the spatial aspect of this event, which is a very important component of the overall evaluation of historical features. Just such absence of the spatial context has been the main impetus for the development of a website (described below in this paper), documenting selected historical aspects of this significant event. Thus the purpose was not to develop another website based on the existing data, but to apply specific tools, procedures and advanced technology typical just of geographers, aimed at exploring selected spatial aspects of Tour de France. The attempt of the representatives of the self-governments of French villages for inclusion Tour de France in the itinerary, as a target or starting point is a huge social prestige and a certain honour for all inhabitants of the territorial units concerned. Equally, also the most intense battles and sports performance during the 100 years history took place in venues which became important destinations just thanks to such event, not only for bicycle fans. The main purpose of our paper

as an independent website is not only to offer an answer to the questions “Who“ or “When“, but mainly “Where“. For this purpose we have utilized standard tools for the development of Internet applications (database systems and script application languages), but also Google advanced distributed technology (Google Maps API, Google Charts API, KML, etc.). Our paper can be characterized as an attempt for interlinking the history of one of the most important sports event in our planet to the present-day advanced technology applied in the distribution of spatial data on the Internet.

## **1. The issue of Tour de France in Literature**

Recently Tour de France as one of the key global sports events and a worldwide social phenomenon has become the point of interest also among many scientific and specialized publications and papers. It is just thanks to the marked historical aspect of this event that has turned it into an interesting event from angles of view also among a mass scientific community not only of sports character. Such overlapping of the historical aspect of Tour de France and various sciences today is the result of many scientific analyses and expert studies. These expert studies and publications can be classified into several levels as regards their point of interest and focus.

Some specific studies deal with the history, strategy, rules and techniques of this probably most exhaustive several days sports event in the world (Liggett, P., et al, 2005). The aim of studies is also to present the issue of the race for the mass public to understand this sports and cultural phenomenon (Partland, J.P., 2006). Most of publications map the overall history of the race (McGann, B., McGann, C., 2006, McGann, B., McGann, C., 2008), and several of them were issued on the occasion of the 100th anniversary of the event (Dauncey, H., Hare, G., 2003, Wheatcroft, G., 2005, Whittle, J., 2003). The history of Tour de France can be recorded in many ways, specific publications mapping this event and the accompanying cultural events associated with the race from its inception up till now in the form of media coverage, songs, stories, films, posters (Thompson, Ch. S. 2006), as well as the visual aspect in the form of chronologically arranged photographs documenting huge victories, fame and agony of the project, are also worth mentioning (Startt, J., et al., 2000). However, we should not omit studies dealing specifically with particular parts of the Tour de France serial starting from particular stages (Allchin, R., Bell, A., 2003), significant legends and cyclists (Fife, G., 2008) or demanding mountain stages (Sidwells, Ch., 2009) and significant mountain crossings and hills (Yates, R., 2006) making this event yet more attractive also for cycling viewers and fans.

A significant benefit from the scientific point of view for the region of Tour de France is a series of various papers analyzing the event in specific areas. There are opinions of academicians who tried to link the scientific area to this prestige sports event (Miller, B., 2003) The importance of this event within a series of the International Cycling Union known as ProTour has been mapped in the papers and comparative analyses of different authors, whether within the demanding aspects of the race (Lucia, A., et al., 2003a) and (Lucia, A., et al., 2003b), or in the cycling speed progress of particular competitions (El Helou, N., et al., 2010). When we consider the Tour de France event as such, scientific studies often mention the importance of this sport and cultural event (Dauncey, H., Hare, G., 2003b), and the beautiful period and long history in France, dated back to 1903 (Gaboriau, P., 2003). The geographical aspect of this event is notable in specific papers (Fumey, G, 2006), the places of regions, their mass culture in relation to the wide world (Reed, E, 2007) or accentuating the national identity of Tour de France on the territory of France (Campos, Ch., 2003) have become key papers enriching the scientific benefits in the context of spatial aspect of this sports phenomenon. In addition to the spatial aspect, also studies analyzing the event in specific broad areas, mainly the economic aspect (Reed, E., 2003, Desbordes, M., 2007), the social aspect (Balduck, A. L., et al., 2011), or last but not least, the physiological aspect (Lucia, A., et al., 2003c), get into the issue. Also many studies focusing the subject of research on specific areas markedly related to the race itself get into the Tour de

France area, such as media promotion (Dunne, K., 2002, Wille, F., 2003), adverse doping scandals at Tour (Schneider, A., 2007, Mignon, P., 2003), or, on the contrary, laying stress on the main actors and cycling heroes during the long history of the event (Dauncey, H., 2003).

Following the above brief overview of literature and studies we can observe that this event has been analyzed recently not only by journalists, experts and enthusiasts, but mainly also by the scientific sphere. With its ostentation and interest Tour de France has gone beyond its national scope and become a global event, albeit it still preserves its French identity. Such a development of global culture in the world affected by the promotion of modern sports can be found also in other significant papers (Dyreson, M., 2003). Historiography of French sport has a far-reaching tradition. A reflection of its certain decades has been published and presented to the expert public (Terret, T., 2011). The history of Tour de France dating back to the beginning of the 20th century provides markedly preconditions for its recording and presentation as clearly as possible. The scientific studies mentioned in this part of the paper focus considerably on analyses of this sports event, however, they cannot cover and present the comprehensive history of the race in specific areas as we wish to do it through advanced technology applied in the distribution of spatial data on the Internet.

## **2. Selected historical and spatial aspects of Tour de France**

The spatial aspect of each sports event is defined by many factors. Some sports are bound to localized elements (stadiums, halls, sports facilities, race circuits), the other, on the contrary, have their sports grounds dynamically developed and sports battles run in various parts of the country. The cycling race Tour de France is also an example of it. Here the spatial aspect can be divided into two plains. On one hand, it is a global, worldwide event, which is watched by viewers from all over the world via television transmission. On the other hand, the term spatial aspect can be understood as a precise arrangement of locations (places being part of Tour de France stages) and their inclusion in the itinerary of a specific year of Tour de France, which thus become the venue (sports ground) of this prestige event. Thanks to almost 110 years history of this event, we can stress some interesting facts resulting just from the dynamic creation of the tours during particular years, when the creation of tour itself offers an opportunity for modification of this global “sports ground“. An emphasis of the presented paper is placed on the characteristics of the main historical aspects of demanding ascents, however, in the introduction attention must be paid to a general overview of the formation of the network of places forming significantly Tour de France features from the global point of view.

### ***2.1 Places characteristics***

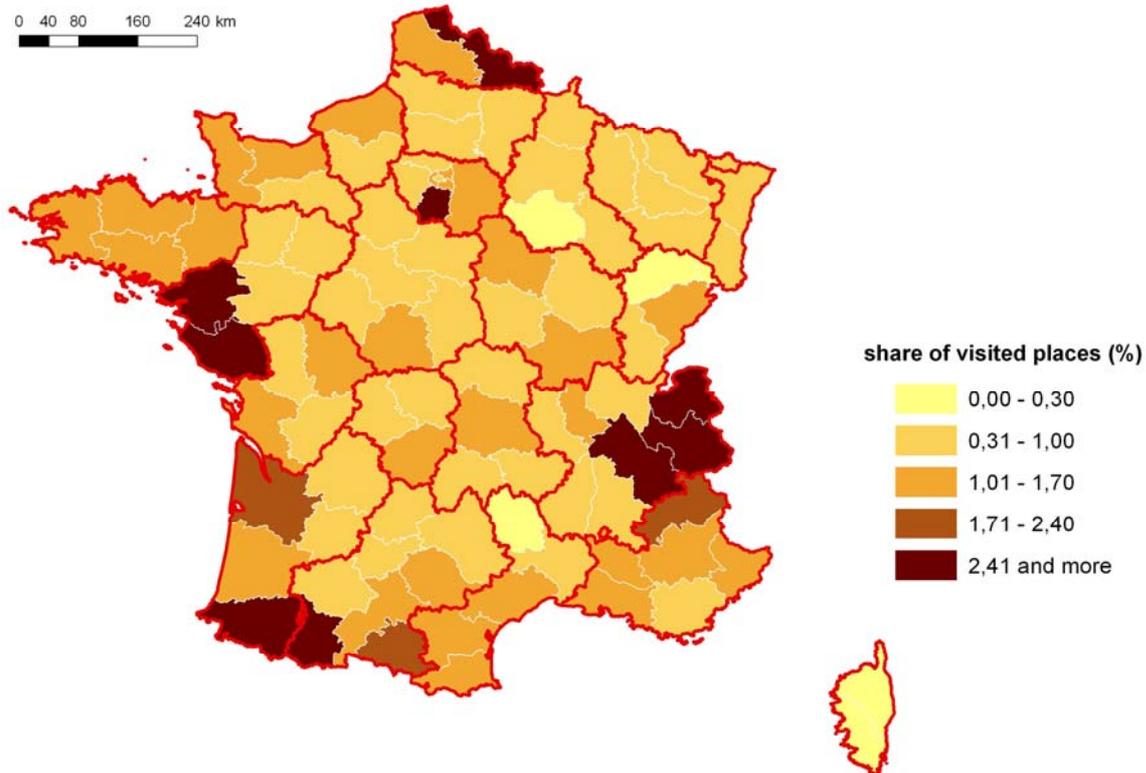
Planning of such a huge event as Tour de France requires the cooperation of a large team of people, and that is why to plan each year of the event takes a long time and is done well in advance of the race. Cycling teams, riders and enthusiasts are watching eagerly the announcement of complete route of the next year of Tour de France. Sometimes the organizers find it very difficult to keep secret the places that will be the starting point (known as Le Grand Depart) or the target place of the upcoming race.

Even a discussion regarding the main starting and target places of Tour de France indicates that it is an event that affects markedly the life of the town. The guest places are presented very positively through this sports phenomenon. On one hand, there are events having a positive influence mainly as regards the economic aspect, not only on the town but also on the region itself; on the other hand, however, the town must provide conditions ensuring the performance of the race, in particular good traffic availability and accommodation facilities.

During its long history, Tour de France has been held in many places, either with the status of target or starting points, in many cases the selection of key places repeats, thus creating a diverse

variability of visits to regions (departments) focused on France (Fig. 1). The connection of guest towns in a large extent depends on the regions with mountain crossings, which inherently belong to the Tour series (e.g., the regions Rhône-Alpes and Midi-Pyrénées). We present briefly a list of all French towns and places of other countries that have become the guests of this important event since the inception of Tour up till now in the context of geography through the above stated portal developed by us. We do believe that the places that are part of the Tour de France phenomenon create fantastic preconditions for the development of a historical and spatial analysis, which can be performed in the near future.

**Fig. 1 French departments - visited places in Tour de France**



Source: <http://www.tdfrance.eu>

## **2.2 Ascents characteristics**

The pomposity of mountain crossings, hills and generally stages associated with vertical ascents expresses the beauty of Tour de France. Some crossing places in mountain regions, as well as the mountains themselves are as famous as the race itself during the long history. And the strength and commitment of some riders are linked to it, who try to get to the mountain crossings as quickly as possible well ahead of the rest of peloton. Just for this reason in yearly presentation of the Tour de France route one of the main issues is the intensity and profile of mountain stages playing a key role in fighting for the first place. The inclusion of legendary mountain passes and mountain centres affects considerably not only the overall character of Tour de France, but has a strong influence on the attendance of specific regions and on the overall coordination of the route. During its almost 110 years history, a variety of ascents were included in particular years of Tour de France. Some of them were included in the itinerary once, but there were also ones the absence of which is almost impossible in the stage programme. The characteristics of selected historical aspects of some ascents are the subject of this part of paper. In our historical analysis

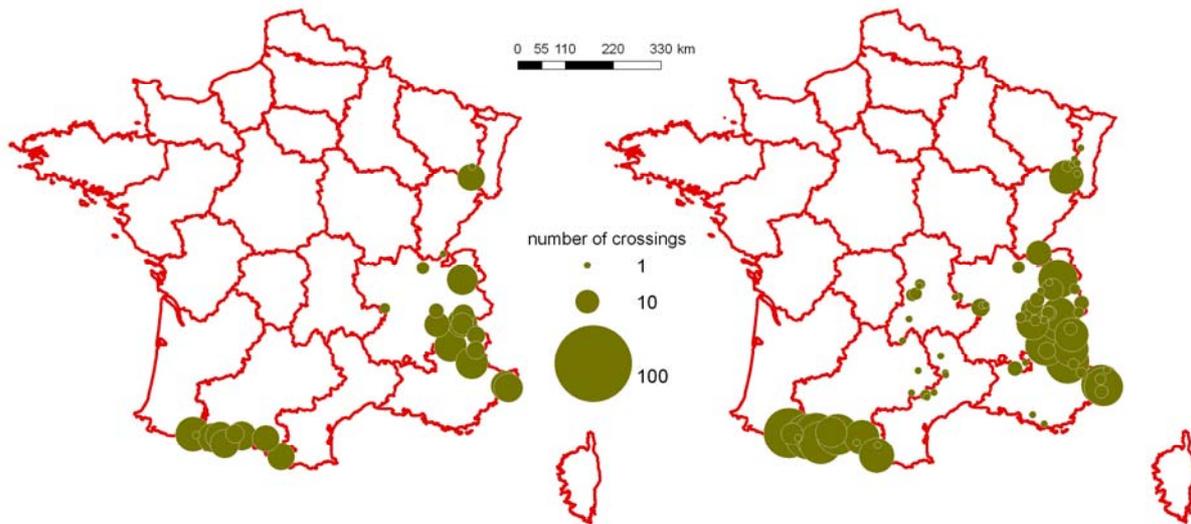
we worked mainly on the official statistics of Tour de France, supplemented with certain absent facts. Such data have been transmitted after correction into database tables and spatial allocation was added to them in the form of precisely defined geographical coordinates using several technical procedures (see part Presentation of results on the Internet of the paper).

The position of famous ascents is precisely defined by their membership in particular geomorphological units. In the preceding part of the paper we specified the attendance of particular departments, as regards the percentage share of centres of the total number of places included in Tour de France as the starting or finish points. It can be seen on the map (Fig. 1) that a dominant share of overall attendance have departments where significant ascents are located, the inclusion of which enriches Tour de France every year. When aggregating the indicators of historical share of attendance of particular departments, as regards the level of regions we can express some outcomes related to spatial arrangement. Most of regularly covered Alpine and Pyrenean ascents are situated in the regions of Rhône-Alpes (83) and Midi-Pyrénées (34). They account for 117 (43,6%) ascents of the total of 268 ascents on the territory of France. If we add the regions of Aquitaine (7) and Provence-Alpes-Côte d'Azur (38), we will discover that more than 60,4% of the total number of ascents is situated in 4 regions of France. This fact is markedly reflected also in the share of attendance of such regions during Tour de France, whereas ascents and centres localised in these regions account for a share higher than one third (38%) of the total number of places included in particular years of Tour de France.

As regards a historical overview of the attendance of particular ascents, it is very interesting to monitor the inclusion of the first significant ascents in the Tour de France itinerary. The first ascent as such included in Tour de France was Col de la République ou du Grand Bois (1161m above s.l.) in the Massif Central. It was included in the stage as early as in the first year in 1903 and its winner was Hyppolite Aucouturier (totally ranked 2nd in 1905). From this year on, 13 riders enjoyed the first place, whereas the last one was Frenchman Richard Virenque in 1997 who won the mountain jersey seven times. In 1959 and 1963, also legendary Federico Bahamontes from Spain triumphed in this ascent who during his participation in Tour de France won a total of 47 ascents, and still is unbeaten in these statistics. The first Alpine ascents were included in Tour de France in 1905. It was Col Bayard (1246m above s.l.) and this year also a crossing through Cote de Laffrey (900m above s.l.) was included twice. Julien Maitron triumphed here twice and Hyppolite Aucouturier mentioned above won the Cote de Laffrey ascent once. Since the first inclusion of such ascents in Tour de France stages they have become relatively frequently visited places, whereas up till now Col Bayard has been included 30 times (recently in 1991 – Pello Ruiz-Cabestany) and Cote de Laffrey 24 times (the most recent winner was Mario Aerts in 2010). Pyrenean ascents were included in Tour de France for the first time in 1910. Also Tourmalet was among them, which is the most frequent Tour de France ascent (totally 79 times). Historically the first winner of this ascent was Frenchman Octave Lapize who became also the total winner in that year. What is interesting about this year is that from among 7 Pyrenean ascents included for the first time (Aspin, Aubisque, Col de Port, Col de Ares, Peyresourde, Portet d'Aspet, Tourmalet), Octave Lapize, the first winner of Tourmalet, won all of them (except Aubisque - François Lafourcade). All of the above ascents belong to historically “top“ visited places, 4 of them rank among the first five as regards overall attendance (Tourmalet 80, Aubisque 77, Aspin 71, Peyresourde 62). The highest hill which has been passed during Tour de France is Restefond (Col de la Bonette) with the sea-level altitude of 2802m above s.l. The first winner in 1962 was Spanish Federico Bahamontes who triumphed there also in 1964.

Working on official statistics of Tour de France (for our needs transformed into developed database tables), between 1903 and 1912, a total of 268 ascents was included in Tour de France stages (of which 231 were on the territory of France). For reasons of better visual comparison of the trend of the number of visited ascents we have developed time sections in 1930 and 1960 (Fig. 2).

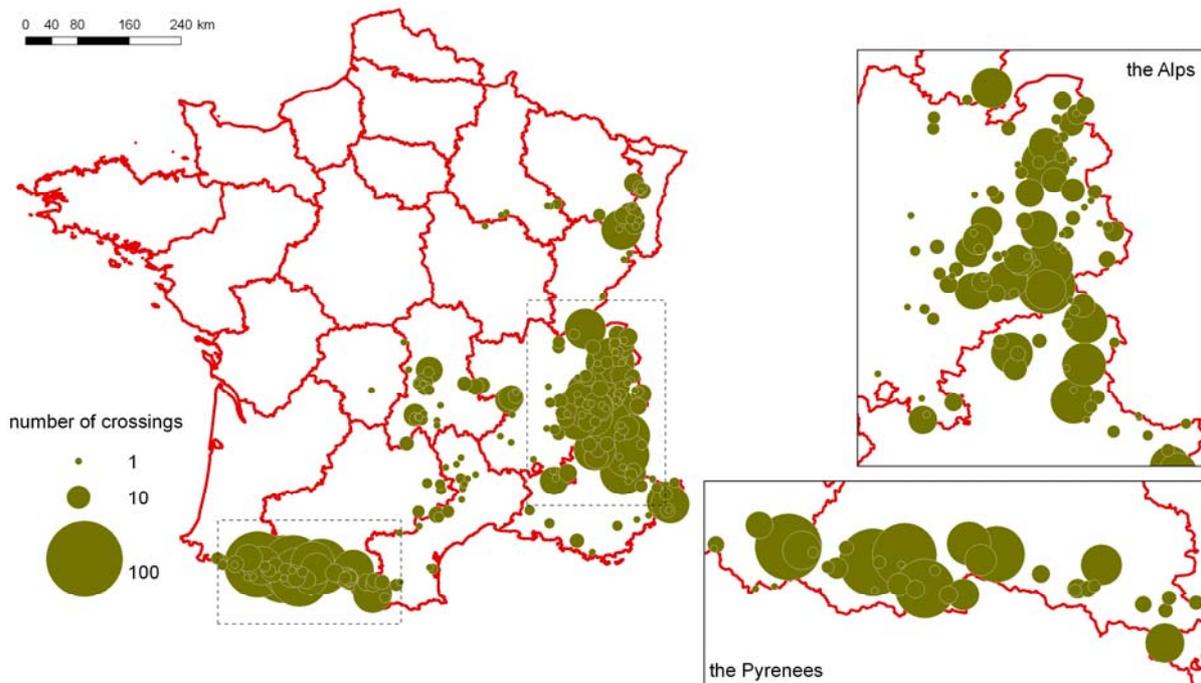
**Fig. 2 Climbs included in the Tour de France (situation until 1930 and 1960)**



Source: <http://www.tdfrance.eu>

In 1930, there were 26 ascents with the most frequently visited hill, Aubisque (before 1930, totally 21 visits). Before 1960, even 77 ascents in total were included in Tour de France, whereas the first place as regards the number of crossings still belonged to the Aubisque ascent (43), and Tourmalet, which is the most frequently visited today, was the second (36). The situation from 1990 is not expressed on the map, when already 163 ascents were covered, whereas the top position as regards the number of visits was kept by Aubisque (64) before Tourmalet (63). The present condition is illustrated in Fig. 3.

**Fig. 3 Climbs included in Tour de France (situation until 2011, while size of the chart shows the total number of visits since 1903 to 2011)**

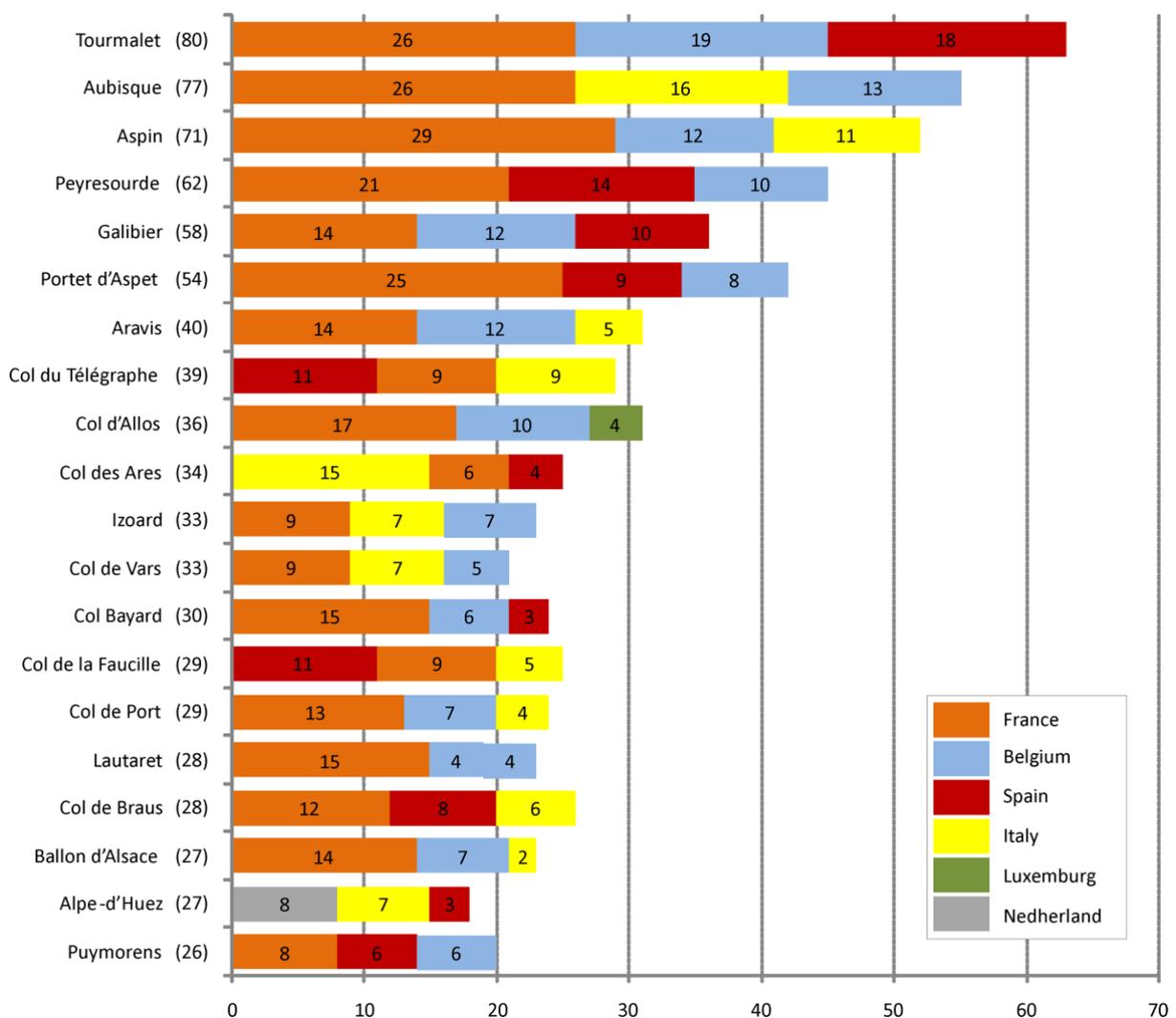


Source: <http://www.tdfrance.eu>

If we eliminate ascents that were passed only once throughout the history, we will get 167 ascents. More than 10 winners were recorded for 43 ascents; more than 20 times were included 25 ascents, and 13 ascents record more than 30 crossings.

Another interesting aspect in the assessment of ascents included in Tour de France is an overview of the success rate of particular nations on the top of particular ascents. Totally more than 80% of all triumphs on ascent tops can be divided among 4 nations. The absolute leader is France (624 victories, 35.1% of the total number of victories on the top). The second are racers from Spain (309 victories, 17.4%). The third and fourth places are relatively balanced, whereas there is a slight dominance in the number of victories for Belgium (248, 13.9%) ahead of Italy (239, 13.4%). With respect to the current position of the riders of both countries, in the future we can expect a change in these two places. Generally we can identify riders from 30 countries who triumphed on the top of ascents. These statistics also cover riders (nations) with an only victory - Estonia (Jaan Kirsipuu, Col du Glandon), Ukraine (Yaroslav Popovich, Izeran) and Republic of South Africa (John-Lee Augustyn, Col de la Bonette). The overview broken down into the total number of victories highlights the dominance of French riders. For a more detailed analysis of the success of this country we have selected an overview of the first three winning nations on tops of 20 most frequently visited ascents (Fig. 4).

**Fig. 4 Overview of the success of individual nations at the top of 20 most visited ascents**



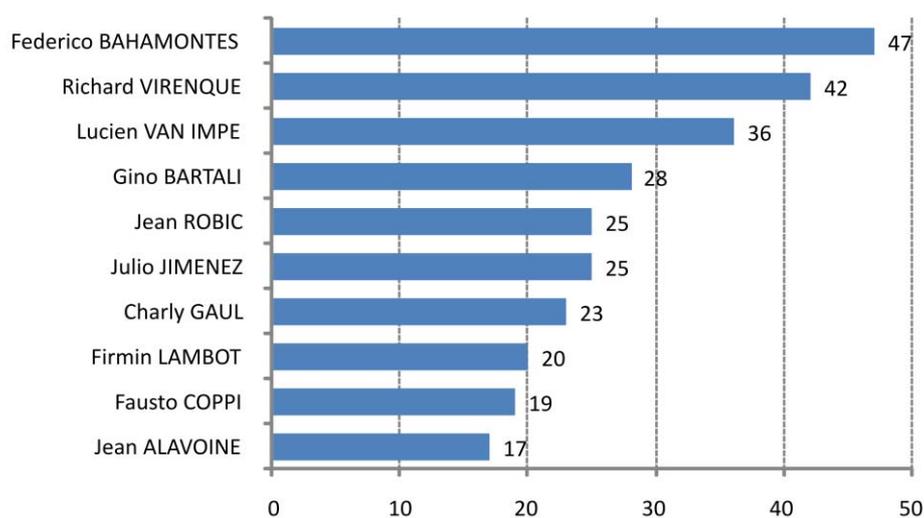
Source: <http://www.tdfrance.eu>

From among the 20 most frequently visited tops, there is a considerably clear dominance of racers from France who dominate for 16 ascents. Other ranks are alternating mainly among Belgian, Spanish and Italian riders. Spanish racers dominate the top of Col du Télégraphe and Col de la Faucille. The only ascent where the Italian riders dominate is Izoard.

The most interesting example and a historical paradox is the Alpe d'Huez ascent. Thanks to years 1976 – 1989 it is usually marked in the sports community as the "Dutch Mountain". In that period they dominated on the top even 8 times, which at present still ranks them first as regards the number of victories. Last time, however, a Dutch rider won this ascent in 1989, and it was Gerd-Jan Theunisse. As a paradox, French riders enjoyed the top of this legendary ascent only twice. In 2011, i.e. in the past year the winner was Pierre Rolland and another triumph was the victory of Bernard Hinault in 1986, whereas his triumph belongs to unforgettable moments of cycling history, when he crossed the final tape holding the hand of the total winner, American Greg Lemond (Ejnes, G., et al. 2003).

Just like in the historical overview of the most successful nations, on the basis of results obtained we can identify significant individuals who entered the cycling history just thanks to their triumphs in the most difficult ascents. The riders being also total record holders as regards the number of jerseys for the best climber ranked in the first three places. The first place belongs to Spanish Federico Bahamonteso who won even totally 47 ascents of Tour de France. This rider, in addition to his overall lead in 1959, won a polka dot jersey for the best climber six times (1954, 1958, 1959, 1962, 1963, 1964). The absolute winner in this activity is Frenchman Richard Virenque who triumphed at the top of ascents 42 times and won a prize for the best climber in the form of polka dot jersey seven times, which is a historical record (1994, 1995, 1996, 1997, 1999, 2003, 2004). The third most successful cyclist is Belgian Lucien Van Impe (36 triumphs), who just like Federico Bahamontes, along with the overall lead in 1976, won the best climber's jersey six times (1971, 1972, 1975, 1977, 1981, 1983). Also other places were taken by personalities who took an extraordinary part in the formation of the Tour de France phenomenon, by multiple triumphs in demanding ascents (Fig. 5).

**Fig. 5 Riders with the most victories achieved at the top of climb**



Source: <http://www.tdfrance.eu>

Using a similar method we could point out also other crucial historical relations in the context of the assessment of Tour de France as a global sports phenomenon. At this point we would like to mark that all features stated in this part are also available on the developed website described below in this paper. Thanks to this it is possible to accomplish also similar historical analyses

separately for particular ascents, such as specific years of Tour de France, not only in a text but also in a graphical form with the application of published maps.

### **3. Presentation of results on the Internet**

One of the main outcomes of presented historical facts is the distribution of these results on a website developed by the authors of the paper<sup>1</sup>. Nowadays on-line presentation of results is an integral part of any research. Undoubtedly for such phenomenon as Tour de France this part of research is very important as thus the historical statistics and data obtained will be available to a wide scope of interested persons. As we have already mentioned above, by developing the website we did not want to supplement the existing quantities of websites dealing with historical overviews, but we wanted to apply techniques and methods that will consolidate all information obtained within space (a map) or show in a graphical form. When developing our solution, we focused (in addition to standard tools for website development) on the application of advanced Google products and services. In graphic visualization we relied on the application of the Google Chart Tools service, and in the cartographic interpretation we applied several services and formats, such as Google Geocoding API, Google Maps API v3, KML (Keyhole Markup Language) and Google Distance API. Just the application of such tools and services allows the integration of spatial aspect into historical statistics and facts, which is crucial for the geographical community in the analysis of various phenomena.

#### ***3.1 Graphical interpretation of results***

Graphical interpretation of a huge data quantity is typical of national statistical portals. It is not only the presentation of the results in an attractive visual form, an important moment is the stimulation of visual senses of the website visitors, which results in much more active perception of the phenomenon under review. The presented solution applies two main technical procedures. Graphical presentation using the PHP scripting language on the basis of an available script from Gerd Tengler “HTML Graphs” and the service from company Google “Google Chart Tools”. Google Chart tools allow the website developers to simply insert into ready documents different types of graphs, whereas the presentation itself is based on the application of markup languages HTML5 and SVG (Scalable Vector Graphics) and on the application of JavaScript scripting language. The website applies several types of graphs (Fig. 6), and their use is in compliance with the basic rules for graphic data visualization.

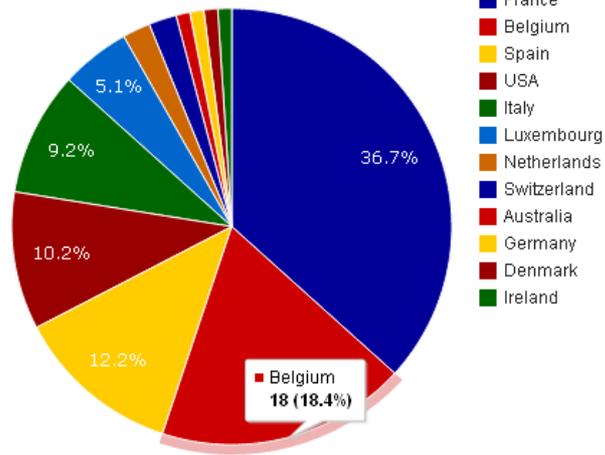
#### **Fig. 6 Examples of charts used at tdfrance.eu**

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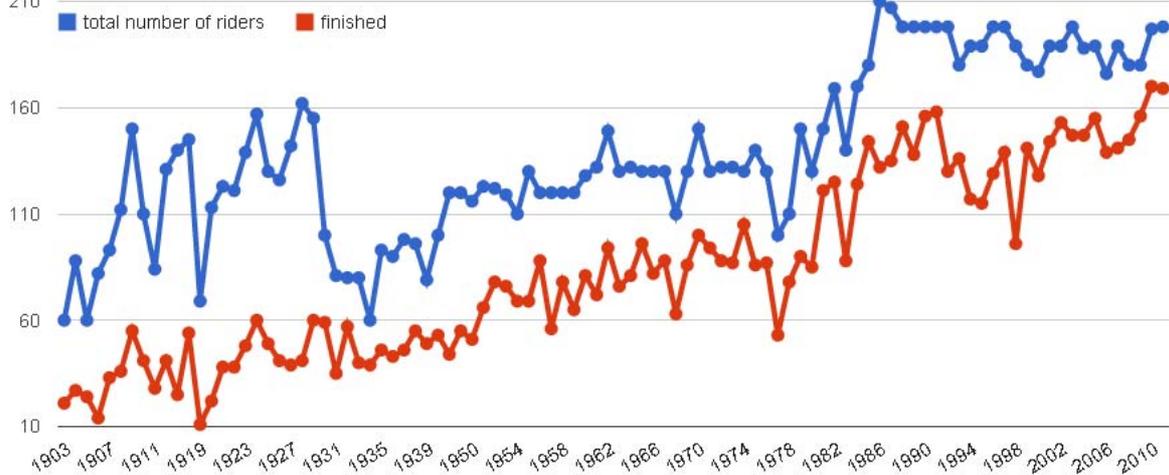
<sup>1</sup> [www.tdfrance.eu](http://www.tdfrance.eu)

Number of titles on the Tour de France by country

France	36	36,73%
Belgium	18	18,37%
Spain	12	12,24%
USA	10	10,20%
Italy	9	9,18%
Luxembourg	5	5,10%
Netherlands	2	2,04%
Switzerland	2	2,04%
Australia	1	1,02%
Germany	1	1,02%
Denmark	1	1,02%
Ireland	1	1,02%



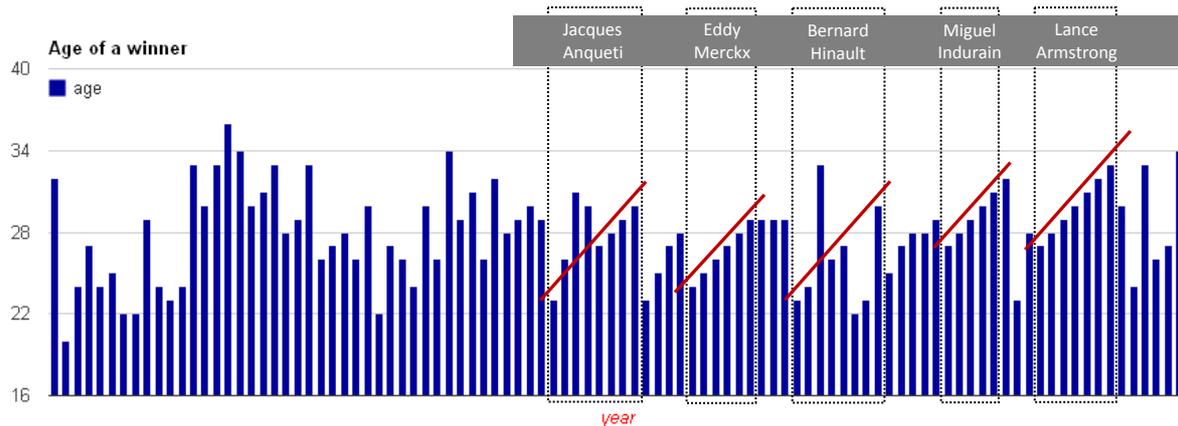
Number of riders on start and finished riders



Source: <http://www.tdfrance.eu>

The benefit of dynamic graphs is the possibility to find out immediately historically significant facts of the statistics under review, including certain development trends. Fig. 6 can identify years with the maximum number of participants (1986 – 210), minimum number of participants (1903, 1905, 1934 – 60), as well as the year with the lowest number of riders crossing the finish (1919 – 11) and also the highest number of riders who finished Tour de France (2010 – 170). A very good example of the interpretation of historically relevant data is also the identification of winning series of the fivefold or sevenfold winner of the Tour de France, following the presentation of the winners' age for the relevant years (Fig. 7).

**Fig. 7 Age of the winners of Tour de France and identification of winning series**



Source: <http://www.tdfrance.eu>

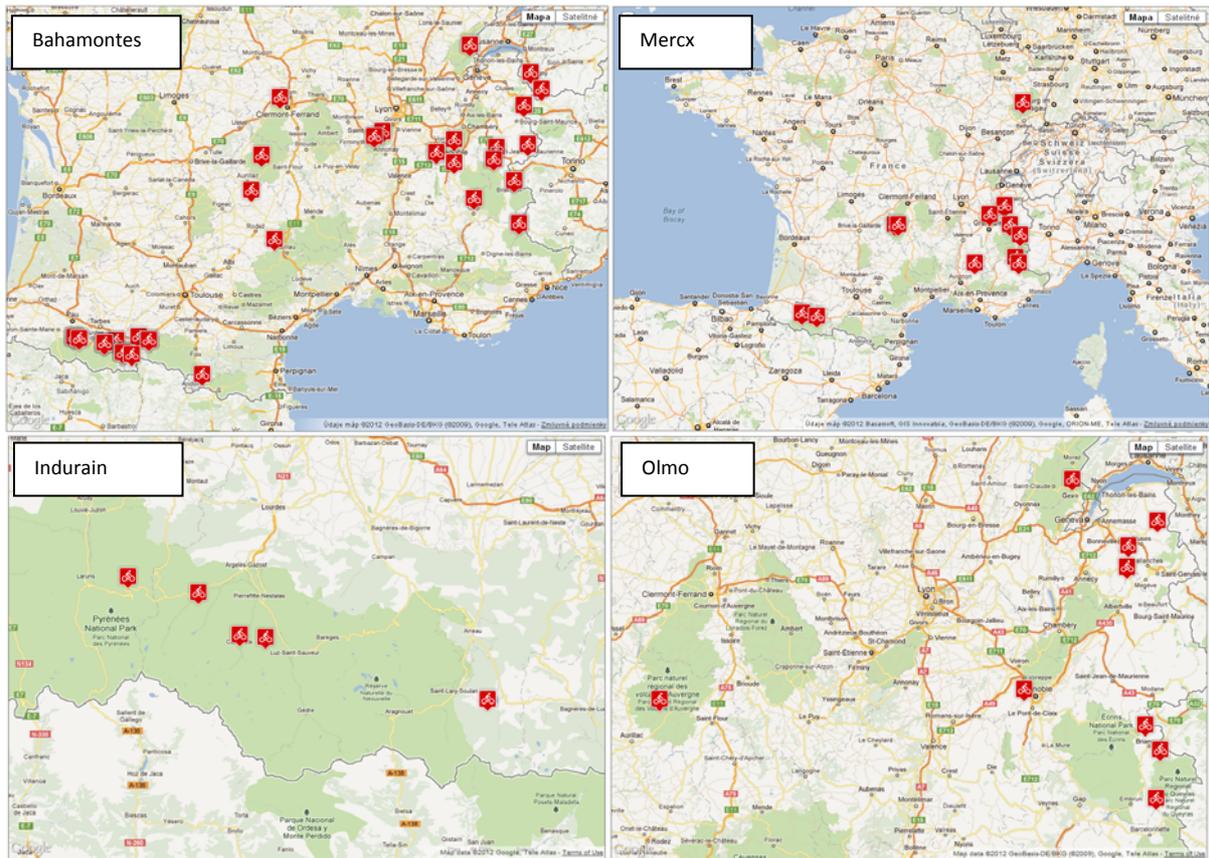
Graphical presentation of historical data is a key element of the presented website for the reasons given above. Transparency and easy interpretation is a crucial element of similar websites, in the specific case it serves for the identification of many interesting historical milestones and events thanks to which Tour de France has become one of the most watched world sports events.

### **3.2 Cartographic interpretation of results**

As regards many aspects, Tour de France can be considered a global event. The region where the fighting take place directly in the field is precisely defined by the location of the relevant place (finish, starting, ascent, pass, etc.) on the ground surface. Just the cartographic presentation of such significant places played the most important role in the development of application. Just like in the graphical presentation, also here the key role played several formats and technology from Google (see above). The primary stage in the development of map output was obtaining the most precise coordinates of particular locations and ascents. For such purpose the Google geocoding service was used in which on the basis of two-level entering of directed identification (the name of municipality and country) we obtained a primary dot map of particular places and ascents. For some places (duplicate names) it was necessary to perform manual corrections based on studies of historical material about starting points or final destinations of Tour de France. In obtaining the geographical coordinates of ascents the results of primary geocoding were considerably inaccurate. To obtain as precise position as possible the results were corrected manually in the Google Earth application, based on comparison of the ascent sea-level altitude and monitoring of the route to the ascent top.

The cartographic interpretation as such applies the Google Maps interface, whereas precise coordinates obtained from geocoding and subsequent correction are stored in predefined database tables (MySQL DBMS). By suitable application of the said technology we can obtain an overview of the regions and ascents in which important cyclists dominated (Fig. 8).

**Fig. 8 Map presentation of winning ascents of selected riders**



Map outcomes of winning ascents can be displayed for each cyclist who won at least one Tour de France ascent. Also such an analysis allows the identification of several interest facts. An example could be Spanish cyclist Eduardo Chozas Olmo who triumphed almost exclusively in Alpine ascents (7 successful results out of 9). An interesting example is also the view of the map of victories of a fivefold champion, Miguel Indurain, who triumphed on ascent tops five times, and each time only in the Pyrenees, out of which only once in his total triumphal victory in 1991 (Val Louron). Following this we can identify the main strategy applied to all Tour de France triumphs, which consisted in time trial qualities of this rider. A natural strength were also his mountains skills when he was able to repulse the attacks of the main rivals in an effective way, however, he never started any unplanned attack, which was associated also with his physical appearance (a robust and high figure). For comparison, legendary Belgian Eddy Merckx and Frenchman Bernard Hinault, won after 12 ascents, whereas they both won also in the Alpine and Pyrenean ascents. The sevenfold winner of Tour de France, Lance Armstrong<sup>2</sup>, won in 10 ascents, divided evenly, 5 in the Pyrenees and 5 in the Alps. Yet more specific looks the map of winning ascents for Jacques Anquetile, who during his 5 overall victories did not win any significant ascent.

Another interesting element in the use of Google technology combined with a cartographic representation is possible switching between the map presentation (different forms) and using 360 degree photographs based on the StreetView principle. Thus each ascent can be presented not only with the precise location, but also displaying a panoramic view from any place in the relevant ascent, from which prospective visitors to these places can benefit as regards the spatial image (Fig. 9).

<sup>2</sup> Lance Armstrong lost in 2012 all his titles because of doping cases from the past. All his results has been canceled.

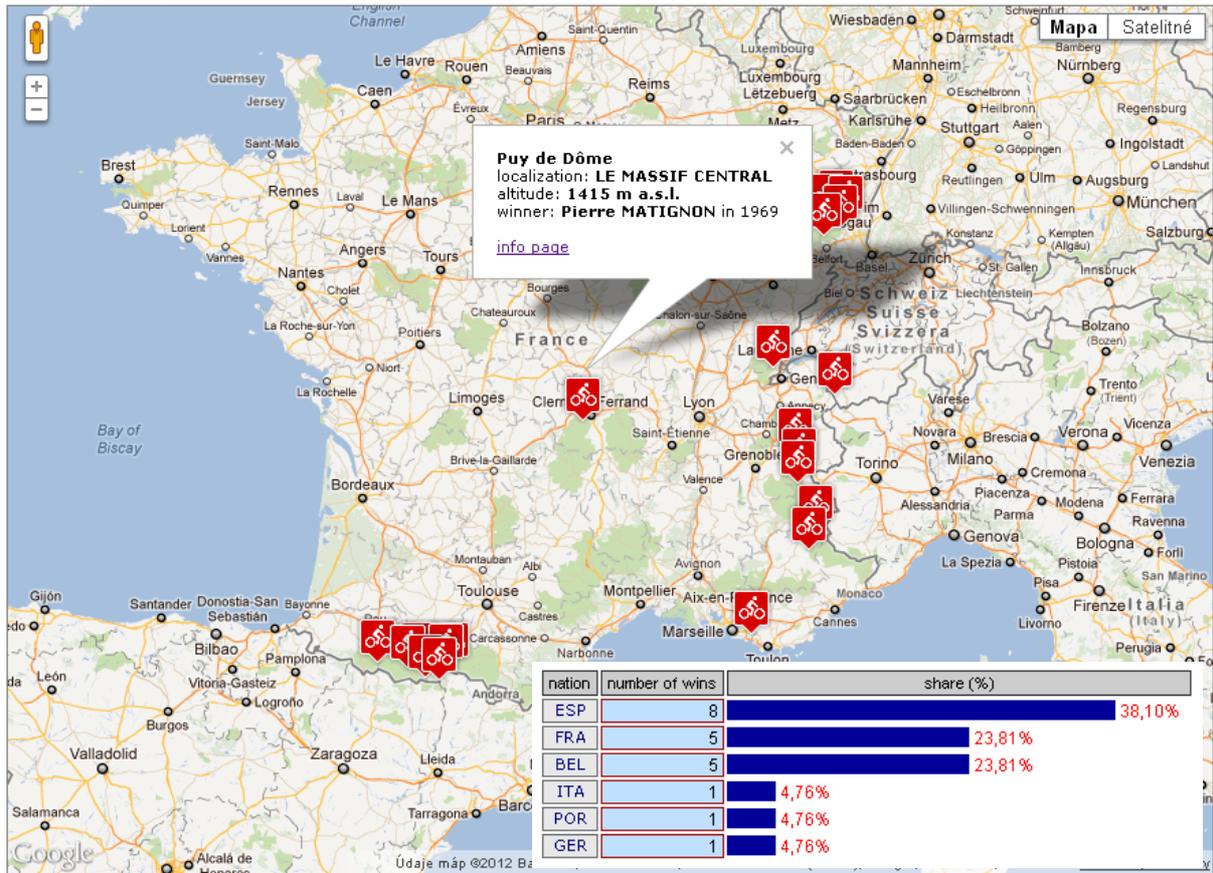
**Fig.9 Possibility of climb localization on the map and displaying of panoramic view using possibilities of street view by Google (example of Tourmalet)**



Source: <http://www.tdfrance.eu>

In each year, ascents are the most favourite attraction for the fans and visitors of this event. This fact is proved by the frequency of particular locations included in the Tour de France itinerary (see Part Places). Therefore in our application we have included a cartographic presentation of ascents in each year of Tour de France. In addition to precise localization, for each year it is possible to display also information on the winner of such ascent, whereas each year is supplemented with summary statistics of ascent victories broken down to nationalities of particular racers. Such a presentation method allows precise identifying of the dominance of specific racers in particular years, as well as an overview of the most successful nations in obtaining prestige points granted in mountain premiums (Fig. 10).

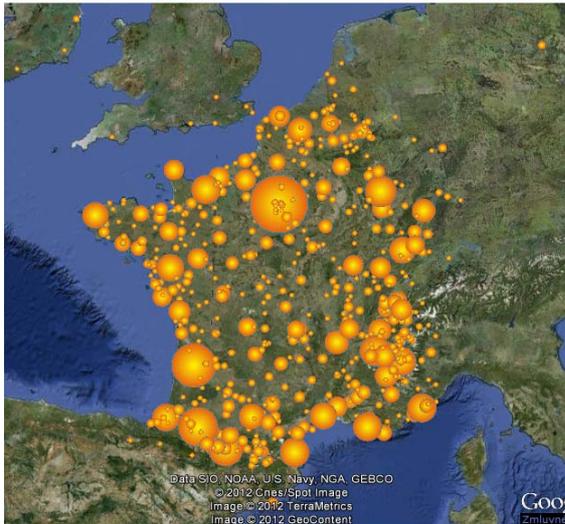
**Fig. 10 Cartographic presentation of climbs in 1969 together with summary statistics based on number of winning nations**



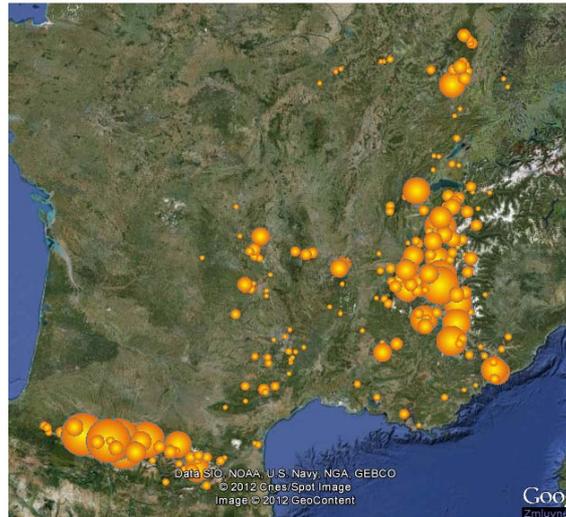
Source: <http://www.tdfrance.eu>

The quantities of collected historical data stored in databases have diverse application. In addition to cartographic presentations using Google Maps, in the development of the application we have also used the properties of Google Earth environment for the development thematic maps. Following available data we have developed 2 thematic maps using the method of different symbol size, whereas each symbol represents the total number of visits in the relevant location, e.g. ascents. For such places as crossings we took into account only the fact whether the place was the start or finish of stage. The thematic maps as such have been generated in the form of KML documents using a script in PHP language developed by us. The final maps comply with the standard KML syntactic rules, specifically element <symbol>. The size of the relevant symbol corresponds to the actual number of monitored visits/crossings and it is calculated using standard equations applied in this method. Thus the client can identify the most frequently visited places of Tour de France, following the size of the symbol (Fig. 11).

**Fig. 11 Use of KML format for presentation of historical data from Tour de France**



*Tour de France places (1903 – 2011)*



*Tour de France ascents (1903 – 2011)*

*Source: <http://www.tdfrance.eu>*

The application of map output in the evaluation of historical relations and facts allows us to cover the spatial dimensions of this event. Such a view is very valuable as in addition to standard historical statistics it presents these data in the space and such perception allows us to explore relations which are otherwise insensible. One of the options is also the use of map documents in creating the route for some of upcoming years, i.e. the possibility to include in the itinerary places from interesting French regions that have not been visited yet. With respect to the mass media coverage of this event these regions would get a chance to promote themselves more markedly, and this fact could contribute to the development of tourism in these regions.

### ***Conclusion***

The history of any sport is full of many significant events, fights, personalities and unforgettable moments. One of the most watched sports events in the world is Tour de France which is evaluated in this paper. The introductory statement is valid for this event all the more because each individual fight and significant event has its exact place, which is, however, unlike the other sports performed in halls or in closed sports grounds available to every viewer who shows interest in such a spectacular “open air show”. Among the most famous and most attractive shots in each year are those in which cyclists are crossing lanes to the tops of ascents, and these are crowded by thousands of fans from all over the world.

In the submitted paper we have attempted to present the Tour de France phenomenon, whereas emphasis was placed on the presentation of selected historical aspects applying advanced technology. It allowed us to transfer historical facts into space in the form of a map presentation of places which are the most interesting as regards the attendance of Tour de France (the ascents to legendary passes and mountain centres). We see the importance of our research in the application of advanced technology used at a targeted website devoted to Tour de France from the geographical perspective. Such obtained results are available to a high amount of fans of this event, and the website provides a summary of all key moments online.

As stated above, the purpose was not to replace or supplement the rich spectrum of websites devoted to selected Tour de France characteristics, but to develop a website with a dominant spatial aspect, and also to prepare a graphical interpretation of selected data. The Internet application as such presents an open system, which we will supplement at the following stage with many interesting historical facts. Our attempt, in addition to the compilation of the submitted paper, was to create a website that would be useful for cycling fans wishing to know to

their cost the crossing of such ascents where their idol dominated in the past. Moreover, the website can be a relevant source of information for sports commentators and journalists who will obtain the most significant historical facts in a clearly arranged form supplemented with the above stated graphical and cartographic interpretation. Last but not least, the paper is designated for the experts addressing the research of not only cycling, but also of other sports events from different angles of view, which just like for cycling cover the spatial aspect of such significant sports and social events.

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